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## Chapter 5. OBSTRUCTION EVALUATION

### Section 1. GENERAL OBSTRUCTION EVALUATION INFORMATION

**500. PURPOSE**
In support of the regional Obstruction Evaluation (OE) program, this chapter provides the Flight Procedures Office (FPO) specialist with a detailed explanation of the FAAs OE program and prescribes the policies, criteria, and procedures applicable to accomplishing the OE responsibilities of AVNs FPO located in each region. Guidelines within this chapter will standardize the specialist's OE applications.

**NOTE: This chapter discusses Obstruction Evaluations under FAR Part 77. Although FAR Part 121 operators are required by FAR Sections 121.97, 121.177, and 121.189 to perform a type of obstruction evaluation, this requirement is not directly associated with the FAA OE program discussed in this chapter.**

**501. BACKGROUND**
The Federal Aviation Act of 1958 (FA Act) and subsequent amendments, legislates the FAAs responsibility for maintaining a safe National Airspace System (NAS). One portion of this responsibility concerns Objects Affecting Navigable Airspace which is the title of FAR Part 77. Through this regulation and internal directives, the FAA complies with the FA Act and evaluates objects that may have an effect on navigable airspace.

**a. OE Handbook**
The primary FAA directive concerning the OE program is Order 7400.2, Procedures for Handling Airspace Matters, and specifically, Part 2 of the handbook, which has the same title as FAR Part 77, Objects Affecting Navigable Airspace. Also in the Handbook, Part 3, Airport Airspace Analysis, discusses on-airport construction that requires an obstruction evaluation.

**b. OE Responsibilities**
Handbook 7400.2 specifies that regional Air Traffic (AT) personnel administer the OE program. The Airspace Branch, (regional 520 branch), with coordinated assistance from personnel in Airports, Airway Facilities (AF), Flight Standards, and the FPO accomplishes the OE tasks. The FPO is primarily responsible for accomplishing OE tasks relating to the instrument environment. Due to the large volume of proposals, obstruction evaluations can be the most time consuming task accomplished by the FPO.

**STATUTORY BASIS FOR OBSTRUCTION EVALUATIONS.** See chapter 1 of this handbook for further information concerning the statutory and regulatory aspects pertaining to the Obstruction Evaluation Program (OE).

**503. – 519 RESERVED.**

## Section 2. REGIONAL OBSTRUCTION EVALUATION PROGRAM

### 520. GENERAL

This section provides an overview of the regional OE program with emphasis on Flight Procedures Office (FPO) duties, responsibilities, and policies.

NOTE: Because an obstruction evaluation on a proposed or existing structure are essentially the same, the remainder of this chapter will refer to all OE cases as if they were proposals. In this manner, qualifying statements such as "The structure will affect, or if existing, does affect…" will not be necessary. Only when emphasis or qualifiers are required will proposed and existing structures be separately addressed.

### 521. ORDER 7400.2, PROCEDURES FOR HANDLING AIRSPACE MATTERS

As stated in Section 1, paragraph 501a, of this handbook, the primary FAA directive concerning the OE program is order 7400.2 and specifically, Part 2 of the handbook which has the same title as FAR Part 77, Objects Affecting Navigable Airspace.

**a. Basic Policies Outlined in Order 7400.2**

Part 2 of this order primarily addresses the mechanics of administrating the regional OE program for Air Traffic personnel. However, scattered throughout the six chapters are significant FAA policies, criteria, and guidelines that are applicable to the Flight Procedures Offices.

(1) The obstruction standards apply to existing and proposed man-made objects including mobile objects, objects of natural growth, and terrain. (Paragraph 4-4.)

(2) The FAAs prime objective in administering the OE program is to ensure the safety of aircraft and efficient utilization of navigable airspace by aircraft. (Paragraph 4-5.)

(3) The FAA recognizes there are varied interests for the use of the nation's airspace. When airspace use conflicts arise, the FAA emphasizes the need for conserving the navigable airspace, preserving the integrity of the national airport system, and protecting air navigation facilities from either electromagnetic or physical encroachments which would preclude them from performing their operational functions. (Paragraph 4-5.)

(4) Each of the four regional operational divisions and the FPO shall review all notices of proposed construction or alteration received. (Paragraph 4-6b.) For ease of reference, the term operational divisions will include the FPO.

(a) A no hazard acknowledgment or determination shall be issued only after all operational divisions agree that the proposal will not create a hazard to air navigation.

This is true whether notice criteria were exceeded or not. (Paragraph 4-6b.)

(b) Should there be a disagreement between the operational divisions in the airspace findings, the disagreement shall be resolved before issuance of the official FAA determination. (Paragraph 8-2.)

(5) Objects that exceed the standards of FAR Part 77, Subpart C, are presumed to be hazards to air navigation unless an aeronautical study determines otherwise. (Paragraph 7-lb.)

(a) Once an aeronautical study has been initiated, other standards in addition to those in FAR Part 77, Subpart C, shall be used to determine if the object being studied would actually be a hazard to air navigation. The additional standards used are those established by the FAA to satisfy operational, procedural, and electronic requirements. (Paragraph 7-lb.)

(b) Any proposed structure which would exceed a height of 2000 feet above ground level, will be presumed to be a hazard, or have a substantial adverse effect upon the safe and efficient use of navigable airspace, unless the sponsor, at the time of filing, makes a clear and compelling case to the contrary. (Paragraph 4-11.)

(6) An adverse aeronautical effect occurs when an object: exceeds the obstruction standards of FAR Part 77, Subpart C (includes by reference, the TERPS surfaces); derogates airport capacity/efficiency; or is found to have an adverse physical effect (for example, signal blockage or reflection) or is found to have an electromagnetic radiation effect (for example, signal interference) on the operation of air navigation facilities. To be a SUBSTANTIAL ADVERSE EFFECT, a significant volume of aeronautical operations would be affected. (Paragraph 7-3 & 7-4.)

(7) Evidence of adverse effect is not sufficient justification for a determination of hazard. However, a finding of a SUBSTANTIAL physical or electromagnetic adverse effect normally requires issuance of a determination of hazard. (Paragraph 8-2.)

(8) Throughout Part 2 of Order 7400.2, guidance, policies, and procedures are provided for a multitude of OE subjects. Examples are: shielding, antenna farms, airport imaginary surfaces, distribution of 7460 series forms, multiple applicants for a single site, multiple sites, multiple structures, negotiations, airspace meetings, structures under the jurisdiction of the FCC, National Ocean Service (NOS) involvement, agricultural aircraft operations, temporary construction, existing objects, petitioned reviews, sensitive cases, and marking and lighting. FPO OE specialists may or

may not be involved with every aspect of OE cases but must be familiar with the entire OE program and the contents of Order 7400.2.

**b. 7460 Series Forms Used in the Regional OE Program**
Examples of 7460 series forms normally seen by the OE specialist may be found in Part 2 of Order 7400.2. These forms are described below.

**1. FAA Form 7460-1, Notice of Proposed Construction or Alteration**
This is the form that is completed by the construction proponent and forwarded to the FAA. The bottom of this form may be used by AT to acknowledge receipt of the proposal in lieu of FAA Form 7460-7 listed below.

**2. FAA Form 7460-2, Notice of Actual Construction or Alteration**
This form is forwarded to AT prior to actual construction. Distribution is then made to interested offices.

**3. FAA Form 7460-5, Obstruction Evaluation Log**
This OE log form is normally used by AT. It may be used by the other operational divisions to log OE cases.

**4. FAA Form 7460-6, Obstruction Evaluation Worksheet**
This form is primarily used by AT when evaluating proposals applicable to FAR Part 77 criteria: notice criteria, obstruction standards, and airport imaginary surfaces.

**5. FAA Form 7460-7, Acknowledgment of Notice of Proposed Construction or Alteration**
This form may be used by AT to acknowledge the original proposal sent by the proponent. It also states that an internal FAA study was conducted to determine if the proposal would be an obstruction, if marking and lighting is required, and if supplemental notice is required. Appropriate blocks are established to show the result of the FAA study. If further aeronautical study is necessary, the block is checked stating the proposal is presumed to be a hazard pending completion of further study.

**6. FAA Form 7460-8, Aeronautical Study of Proposed Construction or Alteration**
This form is completed and distributed by AT to invite public comment on the proposal when an aeronautical study is initiated.

**7. FAA Form 7460-9, Determination of No Hazard to Air Navigation**
This form is completed and distributed by AT when the aeronautical study determined that the proposal would not be a hazard to air navigation.

**8. FAA Form 7460-10, Determination of Hazard to Air Navigation**
This form is completed and distributed by AT when the aeronautical study determined that the proposal would be a hazard to air navigation.

**9. FAA Form 7460-11, Project Status Request**
This form is sent to the proponent by AT for no hazard determinations when a notice of start of construction by the proponent is required and the notice has not been received by the FAA within a reasonable time frame.

**c. OE requests from Airport Division/ADO**
Requests to evaluate proposed construction may come from Airports rather than AT. These requests are normally assigned a Non-Rulemaking Action (NRA) number and may be on a 7460 form, or other forms or documentation. The FPO evaluates these in the same manner as any OE and responds to AT directly rather than back to the Airports office that sent it in.

**d. Dates and Time Limits**
FAR Part 77 and Order 7400.2 establish effective/expiration dates and time limits in relation to the OE process. A brief list of the important dates and time limits are included in this handbook without the detailed circumstances and exceptions included.

(1) A proponent must file a notice of proposed construction or alteration 30 days prior to beginning construction or prior to filing for a construction permit.

(2) Although no FAA notice response time is specified, the FARs 30-day limit required for the notice allows construction to begin after 30 days.

(3) When requested, supplemental notice is required 48 hours prior to the start of construction and 5 days after the construction reaches it greatest height.

(4) Normally, for circularized OE proposals, interested persons have thirty (30) days as an established comment period.

(5) For petition of an OE determination, 30 days are provided following the issuance of the determination.

(6) The effective date (date determination becomes final if not petitioned) of both hazard and no hazard determinations is 40 days after the issuance date.

(7) Occasionally, a determination will be corrected based on new or updated information. Corrected determinations are effective upon issuance, except that in no case will the effective date be prior to the effective date of the original determination.

(8) Determinations on existing objects are effective upon issuance and do not have expiration dates.

(9) Due to the ever-changing aeronautical environment, no hazard determinations have an expiration date. This expiration date is 18 months from the effective date of the determination.

(10) If a petition for review is filed, the regional determination is not final until the petition is resolved. If the effective date of a final determination is changed as a result of a petition or review, the expiration of the determination is adjusted accordingly.

(11) For proposed structures coming under the jurisdiction of the licensing authority of the FCC, the expiration date for a no hazard determination is 6 months from the effective date unless the sponsor makes application to the FCC for a construction permit. For timely FCC application and permit approval, the expiration date is the expiration date specified in the FCC construction permit.

**522. THE REGIONAL OE PROCESS**

Although Order 7400.2 establishes the policies and procedures of the regional OE program, an adequate insight into the actual process for handling cases is not detailed. Also, each region may handle the OE process somewhat differently. An attempt is made in this paragraph to provide the OE specialist with the basic, but typical, processes of a regional OE program. OE processing explanations are provided only when they directly affect FPO responsibilities and involvement in the program.

**a. AT Receipt of Notice**

PAR Section 77.17 requires that construction or alteration proposals be submitted to the Air Traffic Division of the FAA region having jurisdiction over the location of the structure.

(1) Air Traffic is the central control and "primary" for administration of the regional OE program. AT responsibilities include receiving notices, responding to the proponent, initiating aeronautical studies, negotiating with the sponsor, issuing determinations, and specifying marking and lighting provisions.

(2) On receipt of the notice of proposed construction or alteration (FAA Form 7460-1), an AT OE specialist assigns an aeronautical study number, verifies information, and determines if notice is required as specified under FAR

Sections 77.13 and 77.15. Normally, these actions can be accomplished in a relatively short period of time, providing the information on the form is complete and accurate.

(3) Plotting the proposal on a sectional chart, 7 1/2-minute quadrangle chart (referred to as a quad chart), and/or an obstruction chart (OC) is normally accomplished or is provided by the proponent.

(4) The AT specialist may discuss the case with the proponent if problems were found on the FAA Form 7460-1 or if the proponent hand-carries the form or additional material to the region.

**b. Coordination**

Coordination is normally accomplished via telephone, paper correspondence, computer, or a combination of these.

(1) AT will input the case into the OE automation program and/or forward the 7460-1 to the other operational divisions and the FPO. Henceforth, for purposes of this document, the term "operational divisions" will include Air Traffic (AT), Airports, Airway Facilities (AF), Flight Standards (FS) and the Flight Procedures Office (FPO). Accompanying the7460-1 may be other aids to the evaluation such as a copy of the quad or sectional chart depicting the proposed site, proponents' drawings, AT worksheet, etc. For all operational divisions and especially for the FPO, an accompanying chart is a useful tool.

(2) If the proposal is near a military airport/heliport, military training route, etc., AT will coordinate with the military representative. Some regions coordinate all 7460-1's with the military.

(3) AT may coordinate with other entities such as state & local aviation organizations.

**c. Evaluations**

The operational divisions, including AT, complete their evaluations. Many regions have a staggering OE workload. The larger regions handle 8000 or more OE cases a year. With this workload and limited resources, only the most controversial cases will have FPO involvement beyond the initial response. Therefore, the specialist should assure that all appropriate FPO references in the original response to AT are technically accurate because the final determination will likely contain this wording. (A brief review of the evaluation responsibilities for AT, AF, Airports and FS are included, but FPO responsibilities are more detailed.)

**1. Air Traffic**

(a) Studies the structure's effect on aeronautical operations, air traffic control procedures, and airport/heliport traffic patterns.

(b) Coordinates with the other divisions and the FPO on the problems and results of the study.

**2.Airway Facilities**
AF evaluates the potential physical or electromagnetic effect of proposals on air navigation and communications facilities and ATC tower line-of-sight requirements.

**3. Airports**
Airports provides input concerning existing and planned airports/heliports including potential restrictions and impacts on airport operations, capacity, efficiency, and development.

**4. Flight Standards**
FS evaluates for VFR effect, VFR flyways, and a subjective safety impact. FS also should determine the effect upon VFR routes, airport and terminal operations, or other concentrations of VFR traffic. (Order 7400.2, Paragraph 5-11b(l).)

**5. Flight Procedures Office**
As stated in 7400.2, Paragraph 4-23a(3) Responsibilities - Screening of Notice, FPO primarily has the responsibility for FAR Sections 77.23(a)(3) and 77.23(a)(4). Paraphrased, these FAR sections state that an object is an obstruction to air navigation if it creates less than the required obstacle clearance within a terminal or en route obstacle clearance area. In conjunction with FAR references, FPO responsibilities also include the effect of a proposal on IFR operations. (Order 7400.2, Paragraph 4-31d.)

**a. Terminal Area IFR Operations**
Determine the effect upon terminal area IFR operations including transitions, feeder routes, radar vectoring, holding, and Standard Terminal Arrival Routes(STAR). (Order 7400.2, Paragraphs 5-llb(2), 7-2c.)

**b. Instrument Approach/Departure Procedures**
Determine the effect upon any segment of a standard/military/special instrument approach procedure (IAP) including approach light systems. Evaluate both existing and proposed/planned procedures. Determine the effect upon Instrument Departure Procedures (IDP). (Order 7400.2, Paragraphs 4-31c, 5-Ilb(2), 7-2c.)

**c. En Route IFR Operations**
Determine the effect upon Minimum En Route Altitudes (MEA), Minimum Obstacle Clearance Altitudes (MOCA), Minimum Crossing Altitudes (MCA), Minimum Holding Altitudes (MHA), and turning areas. (Order 7400.2, Paragraphs 5-11b(3), 7-33a.)

**d. Adjustments**
If the structure will have an adverse effect on an instrument flight procedure, determine procedural and structural adjustments that can be made to eliminate or mitigate the adverse effects. Some procedural changes may require an environmental assessment. (Order 7400.2, Paragraphs 5-11b(5), 7-34a.)

**e. Response**
If the proposed construction or alteration will have an adverse effect on IFR aircraft operations, procedures, or minimum IFR flight altitudes, the FPO evaluation should clearly state the extent of these effects. (Order 7400.2, Paragraphs 4-23b, 7-3.)

**d. Responses**
Because a proponent may begin construction 30 days after filing the 7460-1, a timely response to AT is expected from all evaluators.

(1) Certain cases may be very complicated and time consuming for the FPO OE specialist. AT should be notified if a specific case will have an abnormally long response time.

(2) The specialist should assure that the original response to AT is technically accurate, because the final determination will likely contain the effects as submitted.

**e. Acknowledgements**
AT responds back to the proponent. This is called an acknowledgement but may actually be a final determination. If the internal FAA study (responses from evaluators) definitely shows the proposal will not be a hazard, the FAA acknowledgement to the proponent is the final determination. Some of the OE cases processed in the region are completed and closed out within 30 days.

(1) If a proposed obstruction is determined to be a hazard, the AT OE specialist will contact the proponent to determine if the structure can be moved or lowered. Some adjustments may be possible so that a hazard determination is not issued. This is accomplished through negotiation with the proponent.

(2) When requested, the FPO will be involved in these negotiations. A no exceed height (NEH) is very important. NEH is an example of the Order 7400.2 requirement for possible structure adjustments. Structure movement and

possible procedure adjustments can be discussed at the negotiations.

**NOTE: Order 7400.2 uses terms such as a study, preliminary study, internal FAA study, and aeronautical study. To preclude any possible confusion, FPO personnel normally accomplish only one study. The intent of the FAR and Order 7400.2 requiring an aeronautical study is met when the specialist accomplishes the FPO portion of the study and responds to AT. However, the FPO responsibility to the individual OE case is not complete until a final determination is issued. A decision to circularize a case for public comment may require additional specialist responses or involvement.**

**f. Circularization**

An opportunity to participate in the study input may be made known to the aeronautical community through circularization. When AT decides to distribute a public notice to conduct a full aeronautical study, AT will circularize the FAA Form 7460-8, containing a graphic of the proposal's location. Order 7400.2 contains policy examples when circularization is required and when not required.

(1) The effects on aeronautical operations, as denoted from the responses of the operational divisions, are included.

(2) The FPO will receive a copy of the FAA Form 7460-8.

(3) The OE specialist may want to recheck all calculations on the original response. The volume of air traffic concerning a specific operational effect may be supplied by the FSDO an/or AT. The comment period on the circularization gives the OE specialist time to reevaluate all FPO comments. A second response to AT (whether formal or informal) may be appropriate. If there is a reversal of the FPO objection or no objection on the original response, a written second response is preferred.

(4) Although relatively rare because of the large volume of OE cases processed each year, an informal airspace meeting may be convened by AT to gather additional facts and information. FPO participation may be requested.

**g. OE Determinations**

Based on the aeronautical study results, AT will complete the appropriate determination form. The determination will list all factors considered in reaching the final FAA conclusion. All timely and appropriate public comments will be detailed.

(1) AT may request additional information and justification from the OE specialist on the case's aeronautical effects based on the FPO response and other comments received.

(2) Prior to issuing a final determination, AT may again attempt to negotiate with the proponent for lowering or moving the structure. FPO participation may be requested.

(3) Before issuing the final FAA determination, AT may discuss the specifics of the case with the OE specialist and representatives from the other operational services. A meeting may be held. These discussions may include the proper phrases and terms that should be used in the determination. For no hazard determinations, any service originally objecting to the proposal must agree to the final decision.

(4) Final no hazard determinations are important to the OE specialist especially when instrument procedure adjustments are required. However, construction notices may be more important because required procedure adjustments may need immediate action.

(5) Generally, the OE no hazard determination and construction notice forms will be the only indication of a negotiated reduction in the proposed structure's height or negotiated movement of the structure.

**h. Reviews**
The sponsor or other interested parties may petition any determination, whether hazard or no hazard, for review by Washington Headquarters. See Section 5 of this chapter for headquarters reviews.

NOTE: The following paragraphs will list general FPO policies on the OE program. Some application policies or examples may be included as a continuation of a general policy. Specific evaluation and criteria application policies will be discussed in the following sections of this chapter.

**523. PRESERVATION OF NAVIGABLE AIRSPACE**
Navigable Airspace is defined in FAR Part 1 and that definition is included in Chapter 1. Navigable Airspace is airspace at and above minimum flight altitudes including airspace needed for safe takeoff and landing.

a. In order to maintain an acceptable level of safety, aircraft require a buffer between operational altitudes and objects. When considering proposed structures, the buffer may be achieved by limiting aircraft operations, by limiting the location and height of these objects, or by a combination of these factors.

b. The specialist should understand that navigable airspace is a limited national resource. Congress has charged the FAA to administer this airspace in the public interest and to ensure the safe and efficient utilization of such airspace. Full

consideration shall be given to the requirements of national defense, of commercial and general aviation, and to the public right of freedom of transit through the airspace.

c. Once airspace is allotted to ground structures, it is considered not retrievable for aircraft use. The specialist must be accurate in the evaluation to prevent inadvertent loss of airspace.

d. While a sincere effort shall be made to negotiate equitable solutions to conflicts over airspace use, preservation of the navigable airspace for aviation must receive primary emphasis.

**524. STANDARDS OF THE OTHER OPERATIONAL SERVICES**

The FPO supports the standards, and the operational decisions based on the standards, of the other operational services.

a. As stated in the first chapter of this handbook, the standards and criteria of each operational service compliment, and in some cases even duplicate, the standards of other operational services. Even with the areas of responsibility defined in Order 7400.2, gray areas may still exist concerning who makes the final determination on a specific standard.

b. The FPO is not concerned about who applies the standards. The FPO is definitely concerned that the standards shall apply and that the defined levels of safety are maintained.

**525. DIVISION OF RESPONSIBILITIES**

The FPO accepts and supports the division of responsibilities concerning obstruction evaluations as defined in Order 7400.2.

a. Because of the overlap in areas of responsibility, the other operational divisions should closely coordinate with the FPO OE specialist concerning problem areas that may fall under FPO jurisdiction.

b. In addition, the OE specialist’s evaluation is based on detailed knowledge of the geographic area of concern and the availability of other division's documents that may affect FPO responsibilities. Consequently, the other operational divisions must assure the tools and information needed by the FPO are supplied. Examples are proposed nonfederal facility locations from Airway Facilities or runway construction projects from Airports.

c. Many regions have interdivisional agreements designating one office to be responsible for a specific element of the evaluation but not necessarily as defined in Order 7400.2. When other services accomplish evaluations that are FPO responsibilities, the OE specialist should be available for telephone conferences and to answer questions. The FPO may support these local agreements, especially if the evaluation

process can be expedited. An example is the local AT facility evaluating minimum vectoring altitude (MVA) effects.

d. The FPO expertise is occasionally requested concerning other aspects of certain proposed obstruction effects in relation to another service's standards. Based on the specific OE case, the OE specialist should candidly discuss the operational aspects of the effects. The specialist should not attempt to limit or define another service's standard, but should discuss criteria interrelationships as they pertain to the FPOs evaluation. The specialist should stress compliance to ALL standards.

**526. RELEASE OF INFORMATION**

Requests from the public for access to or copies of information contained in OE case files should be referred to the Airspace Branch, regional 520, who will process them in accordance with the Freedom of Information Act (5 U.S.C. 552) and Order 1200.23, Public Availability of Information. In addition, requests for verbal information on the status, possible changes to the original proposal, and possible FAA determinations on any OE case should also be forwarded to the Airspace Branch.

**527. PUBLIC DEMAND ON FPO TIME**

The FPO is not staffed for extensive instruction or training of proponents, consultants, and other representatives of construction sponsors concerning all the aspects of FPO obstruction evaluation. This is especially true for the prefiling of evaluations of sponsors trying to find a least offensive location or determining the maximum height for a specific location. There are sufficient public sector consultants that are proficient in these standards application areas.

a. General responses to questions on standards application are appropriate and professional courtesy to public inquiries is required.

b. The aeronautical study of the OE process as defined in FAA regulations and orders is the only approved method to reach a final determination. The specialist should be cautioned against stating or even inferring that the FAA would issue a determination of no hazard on a given informal proposal prior to the formal submission to the region.

**528. NEGOTIATIONS**

Negotiations to find an equitable solution to airspace conflicts are fully supported by the FPO. Normally, the AT OE specialist will negotiate with the sponsor for adjustments to the proposal. The OE specialist will participate in OE negotiations when requested by AT.

a. The OE specialist should be aware of all aspects of the specific OE case prior to participating in a negotiating session with the proponent. If the specialist is not familiar with the case but the proponent is at the region for a meeting, participation is still possible and recommended. The specialist should tell all meeting members immediately that they are

unfamiliar with the case and explain that the FPO participation may be limited to stating policies and explaining criteria application. Final FPO concurrence on all agreements may be withheld until a later date.

b. The specialist shall negotiate in good faith. However, the appropriate standards and policies may limit the degree of negotiation that is even possible. Solutions must be consistent with these standards and policies.

c. During negotiation sessions, an in-depth discussion of issues is appropriate and verbal conflicts between meeting members must be avoided. Verbal abuse may be a negotiating tactic of a few proponents or consultants. The specialist must portray a high degree of professionalism during any type of negotiating session.

**529. RESERVED**

**530. AERONAUTICAL STUDIES ON EXISTING OBJECTS**

The following contains the FPO background and justification for expanding the Order 7400.2 evaluation process on aeronautical studies of existing structures that have not been previously studied by the region.

a. During field visits, the FPO specialists and other FAA personnel occasionally find newly constructed obstacles that affect IFR and VFR aircraft operations.

b. The FPO policy is that any newly discovered structure, from whatever source, that may affect aircraft operations should be reported to the regional FPO. The location coordinates and mean sea level (MSL) height, to the highest accuracy possible, should be provided. The reason for this policy is aircraft safety.

c. The OE specialist should determine if a previous OE study has been accomplished. A review of the OE case may be required and, if appropriate, issuance of a Notice to Airmen (NOTAM).

d. If the structure was previously studied, AT should be informed of the construction.

e. If no regional filing was previously accomplished, all known information on the structure, including IFR effects, should be forwarded in writing to the Airspace Branch. Based on the policies and procedures established in Order 7400.2, AT will determine if an aeronautical study is appropriate.

f. AT forwards the data to the National Ocean Service (NOS) for inclusion in the NOS Quarterly Obstacle Memo Digital Obstacle File (DOF) so that the appropriate obstruction data bases, which are used by numerous agencies and organizations, are updated. In all instrument procedure development, the procedure

specialist utilizes the NOS Quarterly Obstacle Memo - Digital Obstacle File as a source document.

**531. COORDINATION WITHIN THE FPO/AVIATION STANDARDS**

The policy that the FAA shall speak with one voice also applies within Aviation System Standards (AVN). For AVN, within the regions, that voice is the FPO.

a. Occasionally, field offices such as Flight Standards District Offices (FSDO), Flight Inspection Offices (FIO), and even other regional branches may become involved with individual OE cases. This involvement is normally limited to requests for assistance from the FPO. Any questions, information, comments, or objections to an individual OE case must be addressed to the FPO.

b. The FPO must be aware if other FPO/Aviation Standards offices are on the distribution lists for the 7460 forms originating from AT. If other offices receive the forms, these offices must be aware of any required actions they must perform. The FPO shall inform these offices of their responsibilities, if any. Agreements between the FPO and the other offices concerning the required actions may be appropriate.

c. In most OE cases, the FPO can complete the full evaluation. However, cases may arise that require the FPO to request assistance from the appropriate AVN Flight Procedures Development Branch, located in Oklahoma City. Normally, these situations will be extremely "close calls" or when the FPO requires additional data, procedure information/expertise, chart work, or flight inspection results.

   (1) FPO initiated telephone or written requests to the Flight Procedures Development Branch, should include the specific information needed, so as to avoid burdening them with work that can be or has been accomplished in the region.

   (2) If a full obstruction evaluation by the Flight Procedures Development Branch is required, the request shall be in a written format and should contain all the information forwarded to the FPO from AT. A temporary personnel shortage is normally the reason the FPO would request a full evaluation by the Flight Procedures Development Branch.

**532 – 535. RESERVED.**

## Section 3. FPO REQUIREMENTS AND GUIDELINES FOR OBSTRUCTION EVALUATIONS

### 536. GENERAL

The obstruction evaluation process places a heavy demand upon the FPO OE specialist in both time and expertise. Exact evaluations require a detailed understanding of TERPS and all forms of airspace utilization. Sound judgement and common sense are important requirements. This section provides an overview of the elements that specialists use to carry out their responsibilities to the regional OE program. FPO policies and practices for evaluating proposed obstacles are included.

### 537. REFERENCES FOR OBSTRUCTION EVALUATIONS

The following material is referred to in this handbook or other guidance that may be needed for conducting obstruction evaluations.

**a. FAR Part 77, Objects Affecting Navigable Airspace**

Establishes standards for determining obstructions in the navigable airspace and sets forth requirements for notice to the Administrator of certain proposed construction or alteration. It provides for aeronautical studies and public hearings to determine the effects of such proposals on the navigable airspace.

**b. Order 7400.2, Procedures for Handling Airspace Matters**

Addresses the structure, forms, and procedures for processing obstruction studies.

**c. Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS)**

Contains criteria used to formulate, review, approve, and publish procedures for instrument approaches and departures.

**d. Order 8260.19, Flight Procedures and Airspace**

Provides guidance to FPO personnel regarding the obstruction evaluation process and provides guidance on accuracy standards for obstructions.

**e. Advisory Circular 150/5190-4, A Model Zoning Ordinance to Limit Heights of Objects Around Airports**

Provides a zoning ordinance model used as a guide to control the heights of objects around airports.

**f. Advisory Circular 150/5300-13, Airport Design**

**g. Advisory Circular 70/7460-1, Obstruction Marking and Lighting**

**h. Advisory Circular 70/7460-2, Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace**

### 538. OBSTRUCTION EVALUATION TRAINING, NATIONAL OE MEETINGS, AND ASSOCIATED PREREQUISITES

It is highly desirable for specialists assigned to the FPO, to have completed all requisite courses and training, to be experienced in procedures development, and have attained the journeyman grade while

assigned to one of the Flight Procedures Development Branches in AVN-100 in Oklahoma City, before being assigned to the FPO. The following are formal training courses, conferences, meetings, and prerequisites that provide the recommended training and knowledge, in addition to the foregoing for the FPO OE specialist to perform obstruction evaluations.

**a. FAA Course 12051, Basic Obstruction Evaluation and Airport/Airspace Analysis (104 hours)**

This course is primarily designed for Air Traffic, Flight Standards, Airports, FPO, and Airway Facilities personnel involved in the Obstruction Evaluation and Airport/Airspace Analysis Programs at the regional and Washington Headquarters level. The course consists of classroom instruction and laboratory exercises. Content includes application of FAR 77 criteria, evaluation of aeronautical effect, issuance of hazard/no hazard determinations, obstruction marking and lighting, FAR 157 and AIP airport processing, and issuance of airport airspace determinations.

**b. Periodic Obstruction Evaluation and Airport/Airspace Analysis (OE/AAA) Conference**

Attendance at the OE/AAA week long conference is expected because the knowledge gained is available no where else. Most of the meeting is for government personnel to discuss pertinent OE/AAA issues. One day of the meeting provides a government and industry forum that encourages a free exchange of ideas, techniques, and sharing of hard-earned knowledge on OE/AAA problem areas.

**c. Meetings to Discuss Changes to Order 7400.2**

Occasionally, Air Traffic in Washington, and specifically, the Airspace and Rules Division, ATA-400, hosts a meeting to discuss changes to Order 7400.2. Regional participation is expected and the FPO must be adequately represented.

**d. Instrument Procedures**

A comprehensive knowledge is required of the concepts of criteria application and the procedure development process addressed in Order 8260.3 (TERPS), Order 8260.19 (Flight Procedures and Airspace), AC 120-29 (Criteria for Approving Category I and Category II Landing Minima for FAR 121 Operators), AC 120-28 (Criteria for Approval of Category III Landing Weather Minima), Order 8260.38 (Civil Utilization of Global Positioning System (GPS)), and various other orders and guidance necessary for understanding development and maintenance of instrument procedures.

**e. Air Operations**

A comprehensive knowledge is required of general aviation, air carrier, and military aviation practices in both fixed wing and rotor aircraft, for evaluating IFR effects.

**537. COMMON SENSE**
Established criteria are not a substitute for sound judgement and common sense. The criteria do not relieve specialists from exercising initiative or taking appropriate action in recognizing both the capabilities and limitation of aircraft and navigational aid performance.

Generally, hazard determinations are issued for proposed construction only when the obstruction results in a substantial adverse effect upon aviation. Order 7400.2, paragraph 7-4, states that in order for the adverse effect to be considered substantial, a significant volume of aeronautical operations should be affected.

**538. ACCURACY IN EVALUATIONS**
The OE specialist must make every effort to conduct a complete and thorough evaluation of each case. Accuracy is a necessity, particularly since no independent check of the specialist's work is normally accomplished.

a. An unfortunate characteristic of the OE program is that errors made by a specialist may not become apparent for years until a revision or review is made to a particular procedure and the conflict between the new obstruction and the old minimums is identified. The new obstruction may have substantial adverse effects upon important IFR procedures that may have been overlooked. Once the obstruction is built, the effects may be irreversible and the error will result in the minimums being raised.

b. Penetrating obstructions determined to be a hazard to the flying public are potentially dangerous. Also, the adverse effect of penetrating obstructions as defined by criteria may not always be mitigated by raising minimums. The OE specialist must realize that the accuracy of each calculation and decision made on a specific segment of the evaluation potentially affects the safety of aircraft. For this reason, the obstruction evaluation, though tedious, is extremely important and must be accurate.

**539. INSTRUMENT PROCEDURE DESIGN CONCEPTS**
The procedures specialist who originally designs an instrument procedure will utilize the TERPS criteria to provide the best possible product to the pilot. Existing obstacles, high terrain, desired aircraft tracks by Air Traffic Control (ATC), and environmental concerns are all considered in the final procedure design.

**a. SIAPs**
Approach procedures are normally designed to be as simple as possible consistent with the lowest possible minimums. Final approach course alignment to a runway is designed as close as possible to runway alignment.

**1. Missed Approach Procedures**
Missed approach is an integral part of an approach procedure and must be obstacle free. Although statistically used only one percent of the time (based on collision risk model data), missed approaches must be available to both the pilot and ATC. Missed approaches are designed to return the pilot to the enroute structure or to reposition the aircraft for another approach. ATC requirements or environmental considerations may dictate a specific missed approach ground track or holding fix. Missed approach criteria make no assumptions as to aircraft configuration such as loss of an engine. Turns during a missed approach are based on the median speed of the aircraft approach categories.

**2. Circling Approach Minimums**
Circling approach maneuvers are used by a pilot to land on any airport runway regardless of where the final approach course is aligned. Consequently, circling minimums are published on approach procedures and minimum altitudes are provided which contain TERPS obstruction clearance requirements. Actual circling approaches are common at smaller airports. They are uncommon at high activity airports because of aircraft congestion, multiple approach facilities, and ATC procedures. Circling minimums must be protected at all airports with circling minimums because, like the missed approach procedure, this maneuver may be required.

**3. Course Reversal**
A procedure turn or other type of course reversal procedure is normally designed into the SIAP. Course reversal procedures are required for a pilot approaching the airport/heliport from a direction that does not allow direct entry into the procedure. This maneuver positions the aircraft so that the final approach course can be entered directly and in stabilized flight.

**4. Initials and Transitions**
These segments are designed into the SIAP to allow routes for pilots to transition from the enroute environment to the final segment. Because of chart clutter, only the commonly used or requested routes will be published. Routes not requiring a course reversal are provided whenever possible. ATC may develop a Standard Terminal Arrival Route (STAR) to transition to a SIAP as the traffic conditions warrant.

**5. Minimum Safe Altitudes**
Minimum safe altitudes (MSA) are minimum obstacle clearance altitudes for emergency use. They normally include a 25 mile radius from the primary navaid supporting the approach and are depicted on most SIAPS.

**6. Emergency safe altitudes**
Emergency safe altitudes (ESA) include a 100 mile radius from a navaid and are depicted on some military SIAPs. Navigational reception is not guaranteed at the MSA and ESA distances. These altitudes are determined and published to establish the safe limits if the pilot, for whatever reason, must descend to the lowest possible altitude. MSAs and ESAs are designed for emergency use only and are not routinely used by pilots or by ATC.

**7. ATC Minimum Altitudes**
ATC has minimum vectoring altitudes (MVA) for terminal radar vectoring and minimum instrument altitudes (MIA) for enroute center use. These ATC minimum IFR altitudes may have to be considered for SIAP development when radar vectoring is required for the procedure.

**8. Use of Navaids and Cockpit Workload**
Most segments of the SIAP require positive course guidance from/to a navaid or waypoint. Within the original design of the SIAP, navaids in the terminal area are utilized to minimize cockpit workload during the approach. Positive course guidance is provided whenever practical. Consistent with operationally significant minimums, SIAPs should be designed with single pilot operations in mind and consider the minimum navigation equipment required by the FAR. The requirement to tune and identify facilities that are not derived from the final approach facility should be limited to only what is required for the procedure and what would be advantageous to the pilot to obtain lower landing minimums.

**9. Descent Gradients**
Each approach segment of a SIAP, up to the missed approach point, has maximum and optimum descent gradients specified in TERPS. The intermediate segment usually has the lowest descent gradient. This flatter segment is designed into the procedure so the pilot can slow the aircraft to approach speed and reconfigure the aircraft for entry into the final approach. In order to reduce the aircraft noise associated with the approach, other segment minimum altitudes are normally the highest possible, consistent with optimum descent gradients.

**b. Takeoff Minimums and Departure Procedures**
Normally, takeoff and departure procedures are designated only f or those airports/heliports that have an instrument approach.

(1) Review of departure procedures at VFR airports may be conducted as required under FAR Section 135.215(d).

(2) Review of "engine out" departures may, if requested, be conducted, by the Flight Standards principal operations inspector (POI), under FAR Sections 121.177, 121.189, 135.367, 135.379, and 135.398. These “engine out” departures are not evaluated by the FPO specialist and are not part of the OE process.

(3) When an airport originally becomes an IFR airport and an approach procedure is designed, all runways authorized for instrument departures are studied. Like approach procedures, periodic reviews of departure procedures are accomplished by the National Flight Procedures Office (NFPO).

(4) FAR Part 97 IFR takeoff minimums and departure procedures are established by the FAA to provide a margin of safety for all IFR operations. The optimum departure is a diverse departure which is, in essence, an unrestricted departure (straight ahead climbs or turns in any direction). A 40:1 obstacle identification surf ace (OIS) is used for the evaluation. This 40:1 OIS equates to a rate of 152 feet per nautical mile (NM). The TERPS criteria assume the aircraft will climb at a minimum of 200 feet per NM or approximately 30: 1. Therefore, the aircraft is constantly gaining altitude at a minimum rate of 48 feet per NM over obstacles which do not penetrate the OIS.

(5) If penetrations of the 40:1 surface within the diverse departure area occur in other than Zone 1 (small area at the end of the departure runway), the procedures specialist normally attempts to establish a route which has a clear 40:1 OIS. This route is the departure procedure. Departure procedures are designed to be as simple as possible and the majority are runway heading climbs to an altitude before turning. The procedure specialist's evaluation will attempt to produce the least restrictive (lowest) take-off minimums along with the least complicated and safest departure procedure. When possible, the runway will have standard take-off minimums.

(6) For penetrations of Zone 1 or if a departure route cannot be designed that has a clear 40:1 OIS, higher than standard take-off minimums or a higher than standard climb gradient will be specified. The ceiling and visibility established by the take-off minimums shall be sufficient for the pilot to see and avoid the obstructions. The climb gradients shall provide 48 feet per NM obstacle clearance.

(7) For the pilot, higher than standard take-off minimums (ceiling and visibility) are the most restrictive action that can be taken to provide a safe instrument departure. Consequently, a specified minimum climb gradient to safely overfly the penetrating obstruction may be established. If the pilot determines the specified climb gradient can be maintained to the appropriate altitude, standard take-off minimums may again apply; if not, the higher take-off minimums apply. Unrealistically high climb gradients (normally for tall, close-in obstructions) are not established. In cases of numerous close-in penetrating obstructions, a climb gradient is not provided and the pilot is required to see and avoid the obstructions as provided by the take-off minimums. TERPS paragraph 1205d requires a note to be published stating that the obstructions exist and should be considered by the pilot.

(8) Departure procedures may not always be compatible with ATC preferred instrument departure procedures (IDP). Although every attempt is made to provide ATC compatible procedures, the requirement to provide the pilot with the least restrictive take-off minimums and departure procedures may dictate what is eventually published under FAR Part 97, IFR Take-off Minimums and Departure Procedures. ATC requested departure procedures may contain higher take-off minimums and climb gradients than are published under FAR Part 97 for that runway.

(9) Pilots flying under FAR Part 91 are not obligated to comply with IFR take-off minimums. See FAR Section 91.175f.

**c. IFR Enroute Procedures**

Enroute airways and facilities are planned prior to establishment to best utilize airspace, expedite the movement of air traffic, and preserve the environment. Routes through and around congested terminal areas are extensively studied to provide optimum ATC utilization and to minimize delays.

(1) Placement of the enroute facility normally dictates the airway centerline to the next facility. Exceptions are dogleg airways. Availability of land for purchase or lease often dictate facility locations.

(2) The minimum operational altitudes on these airways (MEA, MOCA, etc.) can be determined by the existing obstacles and terrain in the appropriate areas of protection established in TERPS Chapter 17. However, minimum signal in space requirements may produce MEA altitudes considerably higher than required by obstacle clearance.

(3) Dogleg airways are normally established for ATC use to divert opposite direction traffic when congestion or extensive climbs and descents occur. Because of ATC separation rules

and the need to reduce any delay for the aircraft on the dogleg, these routes are normally established 15 degrees left or right of the primary airway.

**d. OE/NRA evaluation checklist**
It is helpful to have a checklist to assure complete evaluation of all procedural elements. See figure 5-1 for an example of a checklist that may be used by the OE specialist to ensure all areas have been evaluated.

**540. CHANGING PROCEDURES**
When IFR procedures are originally developed, all obstructions are considered and the best pilot oriented chart is produced consistent with safety, navaid and runway orientation, and ATC requirements, if any. There are numerous locations on and around airports/heliports where structures of varying size and height can be accommodated without changing the IFR procedures. The basic FPO policy is that major IFR procedural changes should not be considered to accommodate proposed construction. This is especially true when the change would be detrimental to the flying public.

a. Prior to even considering any instrument procedural changes, the FPO advocates negotiations with the proponent to move or lower the proposal. Every effort should be made to negotiate airspace conflicts without changing instrument procedures.

b. The current FPO policy is that no required procedure revision will be initiated until construction is imminent on the new obstruction. The reason for this policy is, in the past, instrument procedures may have been changed based on a no hazard determination and construction never occurred. In essence, navigable airspace was "given away" prematurely and for no reason. When discovered, the procedures would then have to be revised again to retrieve this navigable airspace (return to the lower minimums). During this time period when the minimums were higher, a proponent for new construction can rightfully claim that current instrument procedures do not require this airspace. Also, instrument procedure revisions are work intensive and expensive. Consequently, instrument procedures will not be revised until receipt of the construction notice.

c. The most commonly required IFR procedure change is an increase in the minimum altitude for a specific segment. Change in some segment's minimum altitude may be necessary to accommodate new construction. A secondary effect of an altitude increase is that the climb or descent gradients from the preceding and to the succeeding segments are affected. Climb/descent gradients are based on the minimum altitudes at one fix to the minimum altitude at the next fix. The FPO policy is that climb/descent gradients should not exceed optimum, or if currently above optimum, should not be increased.

d. The following is a noninclusive list where changes to IFR procedures should not be considered, or may be considered, in order to accommodate new construction.

(1) SIAP changes that should NOT be considered.

(a) Major changes or complete procedure redesign.

(b) Increase to straight-in or circling minimum.

(c) Increase to descent gradients above optimum, or if already above optimum, an increase to descent gradients.

(d) Adding a stepdown fix to the intermediate or final approach segment utilizing a navaid not required by the procedure.

(e) Changing the final approach course.

(f) An increase to any minimum segment altitude that would significantly disrupt normal aircraft handling by ATC: for instance, loss of a cardinal altitude.

(g) Changes that would increase cockpit workload in the intermediate, final, and missed approach segments of flight.

(h) Adding a requirement for additional equipment to fly the procedure or to obtain the lowest approach minimums allowed by the SIAP; for example, change a VOR procedure to a VOR/DME.

(i) Raising a glide slope angle above optimum.

(2) SIAP changes that may be considered.

(a) Increasing a minimum altitude of a segment.

(b) The addition of a step-down fix in an approach segment.

(c) Moving a fix.

(d) Changing the course reversal direction to the other side of the course.

(e) Changing missed approach instructions.

(f) Increasing MSA/ESA.

(g) Deleting a transition or initial approach segment of the approach which is not needed or used.

(h) Replacing a needed segment by adding or modifying a transition or initial approach segment.

(3) IFR Take-off Minimums and Departure Procedure changes that should NOT be considered.

(a) Increasing the take-off minimums or climb gradient

(b) Adding a departure procedure where none previously existed.

(4) IFR Takeoff Minimums and Departure Procedures, including IDP, changes that may be considered.

Changing a departure procedure providing the change is not overly restrictive on the pilot.

(5) Enroute and ATC IFR procedure changes that should NOT be considered.

(a) Increasing an airway MEA or MCA affecting significant numbers of aircraft.

(b) Any minimum altitude changes for STARs, MVAs, or airways that would increase descent gradients above optimum on the first segment into SIAPs.

(6) Enroute and ATC IFR Procedure changes that may be considered if a minor change that would not adversely affect a significant amount of aircraft or disrupt the normal aircraft handling capabilities of ATC is required.

**541. PROCEDURES CRITERIA THAT SEGREGATE PROPOSED OBSTACLES FROM EXISTING OBSTACLES.**

Procedures criteria have two locations where the evaluations for existing obstacles and proposed obstacles may be different. The first is TERPS paragraph 289, Obstacles Close to a Final Approach or Stepdown Fix, which specifically states the criteria apply to existing obstacles. The second is TERPS Chapter 12, Departure Procedures, which states, at numerous locations, that the obstacle identification surface (OIS) begins no higher than 35 feet above the elevation of the departure end of the runway. The OIS is established for each runway on the original departure evaluation, based on existing obstacles.

a. This TERPS wording is restrictive. The regional OE specialist must use logic and common sense when applying TERPS paragraph 289 and the TERPS departure criteria. These are the criteria, but not all site-specific peculiarities can be included in the general criteria.

b. An example of common sense application to TERPS paragraph 289 may be a proposed obstruction which is lower, farther from final centerline, and farther from the runway than an existing paragraph 289 obstacle. However, a tall antenna farm located at the FAF or final stepdown f ix is not desired, or if an established FAF or final stepdown fix has no paragraph 289 obstacle, the FPO OE specialist must object to the construction of an OE proposal which would otherwise qualify as a paragraph 289 obstacle.

c. For departures, an example may be a one foot penetration to the existing OIS (if this OIS start elevation is less than 35 feet

above the departure end of the runway), by a proposed obstruction over 2 miles from the departure runway. In essence, this action adjusts the previously established OIS, which was not the intent of TERPS. A minor adjustment to the OIS may be considered for a proposal some distance from the departure runway end, but should not be considered for Zone 1 obstructions.

**542. PROPOSAL ACCURACIES**

Obstacle data accuracy is not absolute. The accuracy depends upon the source of data. The size of the error does not preclude the use of the data, provided it is identified and taken into account. Therefore, all obstacle data underlying a flight procedure will have an accuracy code assigned to it that is directly related to the uncertainty associated with the source of the data.

a. Order 8260.19, Chapter 2, Section 11, identifies the requirement for accuracy coding of obstacle data used in the development of instrument procedures and provides information on the application of these coding standards.

   (1) For precision approaches, raw data with an accuracy code of 1A (3 feet vertical and 20 feet horizontal) can be used without further adjustment. For all other procedures raw data with an accuracy of 2C (20 feet vertical and 50 feet horizontal) or better, can be used without adjustment.

   (2) All raw data with higher (greater than 2C) accuracy codes must have the horizontal uncertainty (associated with the obstacle's accuracy code) applied to the position of the obstacle in the direction of greatest impact, and the vertical uncertainty added to the reported height of the obstacle.

   (3) If higher minimums or excessive climb or descent gradients can be attributed directly to the uncertainty in obstacle position or height, then a survey should be used to provide a higher order of accuracy prior to the next revision or periodic review of the procedure.

   (4) Since AVN does not currently have funds for contracting out of surveys, the procedure development specialist has essentially two options: first, request a flight inspection fly-by, which will result in a 4D accuracy code (50 feet vertical and 250 feet horizontal); or, second, request the assistance of the airport management. In most cases, the airport management can obtain survey coordinates through their respective city, county, or state surveyor's office or have surveys completed in order to mitigate the effect on instrument procedure minimums. Occasionally, the National Ocean Service (NOS) may provide a survey.

b. The primary source for obstacle data used in developing instrument procedures is the Quarterly Obstacle Memo - Digital

Obstacle File (DOF) which is an obstacle database of NOS. NOS assigns each obstacle on the list an accuracy code. The assigned coding is based on the source of the data. The NOS codes have the same footage parameters as the accuracy codes used by the FAA, but the printed codes are not necessarily the same codes used by the FAA for instrument procedure evaluation.

(1) NOS obtains approximately 80 percent of the new obstacles in its database through the OE process. The regional AT OE office sends the FAA Forms 7460-1 and 7460-2 to NOS when the structure exceeds FAR Part 77. Other obstacles are added to the list by NOS aerial photography or individuals sending information to NOS.

(2) When NOS receives an FAA Form 7460-1 and 7460-2, they send a quadrangle map and a questionnaire to the owner of the structure. If the obstruction is marked by the owner on a 7 1/2-minute quad chart with 5-foot or 10-foot contour intervals, it is assigned a 5D accuracy code. If the quad chart has a 20-foot contour interval, the accuracy code is 5E. The horizontal code of 5 (± 500 feet) is assigned anytime the information is derived from an owner on a quad chart.

(3) Since the FAA uses these accuracy codes for procedure development, 5D and 5E codes may have an undesirable effect on instrument minimums. Also, NOS accuracy codes may be improved if the region can furnish OE survey data to NOS.

(4) Order 8260.19 states that accuracy codes are applied when an obstruction is the controlling obstacle. Controlling obstacle is defined in Order 8260.19, Chapter 2, section 11. When an OE proposal is determined, during an OE evaluation, to be the controlling obstacle for any segment of an instrument approach or departure procedure, the FPO specialist will apply a 4D accuracy code in every case.

c. With respect to proposed obstruction evaluations, accuracy codes should be applied when performing aeronautical studies. This ensures that effects of the obstruction are properly evaluated.

(1) Past experience has shown that proponents of new construction are fairly accurate on the proposed height of their structure above the ground. However, inaccuracies are common in regard to the base elevation above mean sea level (MSL), upon which their structure will be built and the location (latitude and longitude).

(2) For FPO obstruction evaluations, the most important factors of a new proposal are the MSL height at the top of the structure and its location. Without a survey of the

proposed construction site, the possible inaccuracies of the proposal height and location must be considered.

d. The following are FPO policies and practices for application of accuracy standards for obstruction evaluations.

(1) The standards of Order 8260.19 apply.

(2) An OE accuracy code of 4D (50 feet vertical and 250 feet horizontal) should be used on all segment controlling obstructions if required by Order 8260.19. (Note that Order 8260.19 requires no adjustments, using 4D coding, be applied to studies involving IFR departure surfaces in zones 2 and 3, intermediate areas, and all procedures with 1000/ 2000 foot ROC such as enroute, holding, procedure turns, transition/feeder routes, and MVA.)

(3) Exceptions for using a less restrictive accuracy code may be for proposals on airport property where good surveys or an Obstruction Chart (OC) exists. Knowing the base MSL elevation and having measured distances from a runway, may eliminate the need to apply an accuracy code. Another exception may be proposals at mean sea level (on ocean beaches or tidal marshes) where the base elevation is known within +/- 3 feet (vertical accuracy A). Another example would be relatively short objects not exceeding the height of tree growth. Local procedure development policies specifies tree heights for obstacle protection (for example, 100 feet) and existing segment minimums should already have considered tree height above the terrain.

(4) If improved accuracy would eliminate an adverse effect, AT shall be notified. Based on the other service's, evaluation results, AT may determine a site survey is appropriate and request the proponent to provide this survey.

(5) The FPO OE specialist should not concur to a no hazard determination with adverse effects without reviewing a requested survey. The review should assure that survey documentation is from a legitimate source, such as a licensed surveyor or licensed professional engineer. The information should be in the form of geographic coordinates and feet above mean sea level. The datum standard must be stated. There should be a statement of the degree of accuracy of the data (+/- footage horizontal and vertical). Surveyed coordinates should be to the nearest hundredth of a second. Usually, the originally filed coordinates are not this precise and the location should change. See Figure 5-2 for a sample site survey from the proponent.

(6) The survey has to be forwarded to NOS with the FAA Form 7460-2 so the appropriate accuracy code can be included with the new listing on the Quarterly Obstacle Memo -

Digital Obstacle File. The OE specialist also must inform the AVN-100 Flight Procedures Development Branch in Oklahoma City of the accuracy code used, especially if procedures have to be revised.

(7) If a survey would eliminate adverse effects, the OE specialist should not concur to a no hazard determination based on a promise that the proponent will furnish a survey after construction is completed.

**543. ERRORS IN EXISTING INSTRUMENT PROCEDURES DISCOVERED DURING THE OBSTRUCTION EVALUATION**

Occasionally, errors in existing procedures may be found when accomplishing the obstruction evaluation. Actions must be taken by the OE specialist or the error conveyed to the Flight Procedures Development Branch for action.

**a. Action**

The first action the specialist should take is to discuss the discovery with the Flight Procedures Development Branch. The apparent error may be nothing more than an improperly documented flight inspection result or some other factor not apparent on the procedures forms. Actual errors require further action.

(1) If minimums are too low and must be raised, immediate NOTAM action by the OE specialist or Flight Procedures Development Branch is required. Other errors discovered besides minimums may also require NOTAM action.

(2) If minimums are too high or other minor errors exist, immediate action may not be required but procedure revision steps should be initiated.

**b. Procedural Changes that affect Obstruction Evaluations**

For errors in minimums lower than required, the OE specialist must note the procedural changes required based on the discovered error and evaluate the proposal based on what the procedure minimums should be. Do not evaluate the proposal based on a procedure that is incorrect and must be changed.

**544. AIRSPACE WHERE ADJUSTMENTS INCREASE OPERATIONAL ALTITUDES**

**545. RESERVED. TBD**

**546. RESERVED. TBD.**

**547. TEMPORARY OBSTRUCTIONS**

Order 7400.2, paragraph 7-37, provides the guidance on temporary structures and temporary construction equipment.

a. The general policy stated in Order 7400.2 is that a temporary structure of 30 days or less should be accommodated by reasonable adjustments provided there is no substantial adverse affect on aeronautical operations or procedures.

b. A temporary Flight Data Center (FDC) NOTAM may have to be issued for temporary structures and temporary construction equipment which affect instrument procedures.

c. Instrument procedure revisions may have to be made if construction equipment use is planned for 120 days or more. This 120-day limit is the temporary FDC NOTAM time limit specified in Order 8260.19, Chapter 2, Section 6.

d. In the event an instrument procedure has to be temporarily revised based on construction equipment, the airspace required by the original procedure is still reserved for aircraft. The OE specialist is cautioned to evaluate new obstruction proposals based on the original procedure and not the temporary procedure. Precise record keeping is necessary for all procedures changed based on temporary construction equipment to ensure proper evaluation of any new proposals and to ensure procedures are revised to the original form when the equipment is removed.

**548. CONSIDERING PROCEDURAL CHANGES**

When a procedure change is considered to accommodate new construction, do not overlook any design limitations addressed in Order 8260.19. For example, do not concur with a proposal when the Flight Procedures Development Branch cannot make the appropriate change because a final stepdown fix does not save 60 feet or reduce visibilities.

**549. PROCEDURAL CHANGES AND ENVIRONMENTAL ASSESSMENTS**

Order 1050.1, Policies and Procedures for Considering Environmental Impacts, establishes FAA policies and procedures for implementing the National Environmental Policy Act of 1969 (NEPA), and specifies AVN environmental responsibilities. One category of responsibility includes new instrument approach procedures, departure procedures, enroute procedures, and modifications to currently approved instrument procedures.

a. During an aeronautical study, the OE specialist determines if modification of the instrument procedure to accommodate a proposed obstruction is technically possible. If modification is possible and prior to stating that it may be possible to modify the procedure, an analysis of the environmental consequences of the action is required.

b. The categorical exclusions in Order 1050.1 do not apply in noise sensitive areas or at a location of known environmental activism. When considering changing procedures, an environmental assessment is required if the change is apt to be controversial.

c. Recognizing that cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time, a review is necessary to determine the cumulative impact of past, present, and

reasonably foreseeable future in order to judge whether significant changes in noise will occur.

d. All proposed changes to a procedure not categorically excluded will require an environmental assessment to determine the extent of the impact. If the result of the assessment is a Finding Of No Significant Impact (FONSI), then it may be possible to modify the procedure. Requirements for an Environmental Impact Statement (EIS) may possibly result in no modification to the procedure being considered. The proposal proponent seeking the revision may consider paying for an environmental assessment to speed the OE determination process.

**550. EVALUATING VFR EFFECTS**

The FPO is not involved in evaluating VFR effects. Air Traffic has the responsibility to identify any possible effect on visual flight operations and coordinate with the Flight Standards point of contact, as necessary.

**551. OVERVIEW OF THE FLIGHT PROCEDURES OFFICE APPLICATION POLICIES**

The FAA has a congressional mandate to manage navigable airspace. Every effort should be made to negotiate a reduction in height of proposals or relocation to maintain current levels of safety.

a. The FPO policy, based on the guidance in Order 7400.2 and this handbook, is that proposed structures can be accommodated provided their construction would not have an substantial adverse effect on IFR operations. A major concern is aircraft safety.

b. In conjunction with criteria application, the specialist should evaluate the proposal based on the pilot's viewpoint. Flying in the area of the proposal can provide insight not always apparent from a map study.

c. If a thorough evaluation reveals that there would be an adverse effect on IFR operations, the specialist is obligated to object to the proposal.

**552. TOOLS FOR OBSTRUCTION EVALUATIONS**

There are some tools available to assist the OE specialist in the obstruction evaluation. The most productive tools are the newer automation aids. There are also manual aids such as maps, charts, and forms that have been used successfully for years. Today, automation programs assist in the evaluation process, but cannot fully replace the manual tools that are still used for complex cases.

**a. Automation Tools**

The use of computer programs has expanded in the past few years. Several OE automation tools are utilized in the regions. These programs were developed by FPO personnel for local use. Through lack of a national program, they are now shared between regions. The FPO developed programs are occasionally updated or expanded

by the developers. The automation information presented in this handbook is meant for guidance and understanding for those using these programs. Use of the automation tools is not mandatory, but for some evaluations, automation is almost indispensable. The following are common automation tools used in the regions.

**1. The OE Networks**

Currently, 2 different networks are being used. One is a local area network based tracking system developed by a contractor for Air Traffic in Washington. Some regions now have an automated OE network available. Networks have been criticized for being slow and cumbersome. However, each offers a database that contains a current status for each and every OE case. Networks are a tracking system only and have no calculating capability for FPO evaluations.

(a) The OE network system manager is generally located in the regional Air Traffic Division. Users require a network cable connection and a network card in their computer.

(b) The focal office for the OE database is the regional Air Traffic 530 branch. The 530 office receives a new FAA Form 7460-1 from a construction proponent. They enter the information from that form into the OE network database and assign an OE case number. Once the information resides in the network, a user from any of the operating divisions may access the data.

(c) Some AT offices transmit the OE case via the computer network only to the other operating divisions. A hard copy of the FAA Form 7460-1 and map are not circulated. Other regions still use a hard copy 7460-1 form and a map with the obstruction plotted, but use the computer network for responses.

(d) One advantage of the OE network is that the OE data can be loaded to the Preliminary Regional Obstacle Screening Evaluator (PROSE-see paragraph (2) below) very readily on the computer and the need for manual data entry by the FPO is eliminated. Some FPOs have print capabilities for the computer generated 7460-1 form and download all cases into a FPO OE tracking program. All these actions occur at the same time PROSE is being utilized.

(e) After analysis of the proposed obstruction by the operating divisions, a response may be made via the OE network. Each user is assigned a user ID

and password. Response fields in the OE network may only be accessed by the appropriate user, that is, only the FPO may make a response in the FPO response field. Once the response is made, it is "locked" by the user. No one is then able to change that response.

**2. Preliminary Regional Obstacle Screening Evaluator (PROSE)**

This software program is used as an OE "rough" screening device. Although this program has not been "officially" certified by the FAA, it was put into operational use in 1986. Since then, PROSE has been extensively used by a few FPOs (specifically Chicago and Atlanta FPOs). Changes and updates were made immediately upon discovery of any error. At the time of this writing, there were no known errors or discrepancies in the program.

(a) To use this software, a database must be created consisting of all the existing and planned airports/heliports, approaches, airways, and facilities in the region. The database generation may take several weeks. Some regions have already created this database, and only need to make additions or corrections as new procedures are developed or other procedures are modified. The major drawback of PROSE is the database creation and maintenance.

(b) The PROSE program defines airways, approach trapezoids, and other airspace requirements by approximating these areas with circles. These circles are always large enough to encompass all possible areas of an instrument procedure. A PROSE evaluation is very thorough and may identify more problems than actually exist. It is an excellent screening program which will identify almost all potential problems. Based on the PROSE results, the areas "flagged" for possible effect will require further study. Areas not "flagged" will not require further study.

(c) A major operational benefit of using PROSE is that it eliminates errors due to inadvertently overlooking any area in an obstruction evaluation. This screening process, by omission of a program printout, also allows for a quicker review. Of course, a properly maintained and accurate database is critical

(d) A starter package explaining how to initialize the PROSE program can be obtained from the Chicago

FPO. OE specialists familiar with its operation can help with any questions for initial setup.

(e) Once the PROSE program and database are set up, the branch secretary, clerk, or OE specialist can input the new daily OE information into PROSE. This can be done directly or through data file manipulation if the OE data is entered into another program like an OE index. In those regions where AT is using an automated OE management system, the AT program builds a daily OE file that the PROSE program can use without having to enter each OE case directly. The secretary can then run the PROSE program and distribute the results to the appropriate OE specialist for further processing. The specialist can then do a quick screen and separate the OE cases that have no effect. These cases can usually be evaluated very quickly. A rapid turnaround for the cases is the main administrative benefit of PROSE.

(f) PROSE will create a printout for a typical OE case. Some important terms and their definitions regarding the reading of a PROSE printout are discussed in the following section, where the evaluation of enroute and approach segments are thoroughly discussed.

**3. SUPERPROSE**

SUPERPROSE is a follow-on program to PROSE. This program initially runs the PROSE program but retains the results internally rather than producing a printout. The specialist is then provided a new menu from which to chose non-precision, precision, or radar/departure/circling evaluations. Using the TERPS Calculator programs (see paragraph (4) below), the program evaluates every approach of the selected type at an airport if the PROSE program had previously determined that there may be an effect. SUPERPROSE then prints specific results for each evaluated approach at that airport.

**4. TERPS Calculator**

TERPS Calculator software provides a precise and specific analysis of one requested evaluation at a time.

(a) Various different TERPS Calculator programs have been developed by OE specialists. These programs are useful tools in the OE process, although they have not been “officially” recognized by the FAA.

(b) These programs provide an evaluation of the final and missed approach segments of the instrument procedure.

(c) Although a database is required, the program provides for keyboard data entry without first putting it into a database. Also, one of these software programs can utilize the PROSE database and is extremely valuable in determining OE effects. TERPS Calculator is generally used after potential effects have been defined by PROSE or manual screening.

**5. GEODES/GEODET**

Often in the OE process, distances and courses based upon latitude/longitude information are necessary. Two programs were developed which accomplish this task. GEODES, and GEODET. No database is required to use these programs. They are stand-alone programs that are very user friendly.

**6. GT-CALC: Geodetic/TERPS Calculator**

GT-CALC consists of a set of application modules and an on-line database of navigational aids, airports, and airway data. GEODES is one of the interconnected modules. Besides database utilization and geodetic computations, GT-CALC has modules for ILS, MLS, diverse departure, holding, and procedure turn. GT-CALC is a useful program for initial development work for instrument procedures, obstacle analysis, and data retrieval. However, there is no provision for updating the on-line database. This capability must be developed because data become obsolete quickly.

**7. Instrument Approach Procedures Automation (IAPA)**

The development of IAPA first began in 1974. The Automation Technology Branch, AVN-22, in Oklahoma City, is the software and hardware manager of IAPA. Unfortunately, the primary function of IAPA has been limited to development of instrument approach procedures. Rapid OE analysis is rarely possible on IAPA. The capabilities of IAPA are increasing and new equipment and updating is expected as the technology is refined.

(a) Presently, IAPA is of limited use in the OE program. IAPA may sometimes be helpful in the analysis of a complex OE case such as determining the effects in a turning missed approach area. However, creating an IAPA workfile to perform this analysis would be necessary. Although the time needed to create a workfile as been reduced recently, the large

number of OE evaluations (approaching 8000 a year in some regions) eliminates IAPA's usefulness for most OE evaluations.

(b) Even after the workfile creation, the complete final approach portion of the approach procedure has to be built prior to evaluating other segments such as the missed approach. Normally, a manual map evaluation or using the PC programs listed above is much easier and quicker. However, IAPA has the advantage of being a certified program that produces certified results.

(c) IAPA is a menu driven program. The menu results of segment development can be printed. IAPA segment programs are useful for trying alternate missed approaches, finals with stepdown fixes, and new initial/feeder routes, should the specialist determine that procedural changes may be appropriate.

**8. Airman's Management Information System (AMIS)**
The AMIS database is helpful to the OE specialist because it contains required airport/heliport and navaid data with the appropriate accuracies required for instrument procedure design and flight inspection. Although the AMIS database is more extensive than airport/navaid data, these are the primary data used by the FPO. Also, AMIS services the data need for IAPA. This is accomplished by a nightly download of data from the AMIS database to the IAPA database that is used by AVN-100 and the FPOs. Although some FPOs do not have easy access to the AMIS database, all have access to the IAPA database, which is AMIS driven. The Flight Inspection Technical Support Branch, AVN-21, manages AMIS information. AMIS is the FAA official airport and navaid data source for FPO database creation and for obstruction evaluations.

**b. Manual Evaluation Tools**
There are a number of manual evaluation tools which are required or desired to properly complete obstruction evaluations.

**1. Basic Supplies**
A sharp pencil (.05 mm mechanical pencil is recommended), dividers, an engineers scale ruler, and an engineers calculator are considered the minimum requirements for obstruction evaluations. A drafting table is also desired for the extensive map study that may be required for obstruction evaluations (and also for the numerous other map tasks accomplished by the FPO).

**2. Maps and Charts**
The major maps and charts needed are: current instrument approach charts, sectional charts, VFR terminal area charts, current enroute low altitude airway charts, and airport obstruction charts (OC). A set of 1:250,000 topographic charts and quad charts are occasionally needed.

**3. Other Tools**
Besides access to FAA Form 5010-1's and the Airport/Facility directory (A/FD) for the regional area of responsibility, the primary remaining tools are:

(1) The FAA Form 8260-3,5, or 7 series forms containing the instrument procedure data.

(2) The FAA Form 8260-9, Standard Instrument Approach Procedure Data Record, which contains the controlling obstructions for all segments of the approach, as well as ROC, minimum altitude adjustments, etc.

(3) A SIAP graphic consisting of approach segments drawn on a sectional chart or produced by IAPA.

(4) Plastic trapezoidal templates or transparent segment overlays for different scale maps, which will help speed analysis time.

**4. Job Aid**
Figure 5-1 is a job aid that lists the primary IFR procedures that should be evaluated for each obstruction evaluation. This standardized obstruction evaluation checklist was selected from examples of job aids currently used in FPOs. The OE specialist is encouraged to use this job aid to document any effects discovered for an individual proposal. The completed job aid can also be used for the response to AT and as a permanent record of any effect discovered. The obstacle evaluation process detailed in the next section uses this job aid as the format for the evaluation.

**553. – 555. RESERVED.**

## Section 4. THE FPO OBSTRUCTION EVALUATION

### 556. GENERAL

The level of difficulty involved in an obstruction evaluation will depend upon the location and height of the proposal in relation to approach procedures and other instrument procedures and operations. The OE specialist must have an intimate knowledge of TERPS criteria and principles. In addition, the specialist must be familiar with the procedures and operations of the FPO and the assigned area of responsibility. After discussing obscure factors of the OE analysis, this section will methodically describe the individual steps for accomplishing an obstruction evaluation. To assure a complete evaluation, the job aid (figure 5-1) lists the typical steps involved and is the evaluation format detailed in this section.

### 557. THE MORE OBSCURE FACTORS OF THE OE ANALYSIS

Study of aeronautical effects of proposed construction must consider more than the airports and FAR Part 97 instrument procedures charted in the terminal procedures publication (TPP). Public seaplane bases, public heliports, special instrument approach procedures and departures, proposed procedures, radar approaches, and direction finder (DF) approaches are also included in the aeronautical evaluation process. Consideration of these more obscure procedures and airfields may be difficult since they may not have published charts. Therefore, listings of all the special SIAPs, proposed procedures, heliports, and direction finder approaches should be constructed and maintained for easy reference.

**a. Use of the Official 8260 Series Forms**

As part of the OE process, an important habit to establish is to always refer to the 8260 series forms for the approach or departure procedures at the airport/heliport being evaluated. Commercial and government produced approach charts are good for a quick visual reference, but the official procedure is documented on the appropriate 8260 series forms.

(1) The detail provided on these forms discloses information, such as a remote altimeter penalty, which may otherwise escape consideration. The 8260 series forms may also be the only source of information on direction finder approaches, Army and Air Force procedures maintained by the FAA, and special procedures.

(2) Appropriate copies of all 8260 series forms must be maintained in the FPO for easy reference. Coordination should be accomplished, as required, with other specialists in the FPO when the proposal falls on the border of two areas of responsibility. Coordination with another region should be accomplished when the proposal is located near regional boundaries. OE analysis in an area of responsibility of another specialist or region may be possible but is not recommended without coordination. Access to the information contained in the appropriate 8260 series forms is a major reason for the coordination.

**b. Minimum Sector Altitudes (MSA)/Emergency Safe Altitudes (ESA)**
Another obscure area of the obstruction evaluation is the maintenance of MSA/ESA. Generally, SIAPs will provide altitudes for emergency use in the form of MSA/ESAs. ESAs are limited to some military procedures. The OE analysis must consider MSA/ESAs as part of the total process. Some regions maintain databases on MSA/ESAs and use automation for this evaluation. A proposal requiring an altitude increase of an MSA or ESA will not normally be sufficient cause to support a determination of hazard; however, notification to the Flight Procedures Development Branch is important for OE cases which, upon receipt of the construction notice, raise the MSA or ESA.

**c. Proposed SIAPs**
As part of the evaluation process, the specialist must protect airspace for proposed approaches. This protection is particularly critical when a precision approach is proposed for a particular runway or future Category II/III capability is desired.

(1) In order to object to a particular construction proposal based on a proposed SIAP, the need for the procedure must be known by the OE specialist. Obviously, a specific written request to develop an instrument approach procedure at an airport/heliport would be one example. The term "plan on file" commonly refers to future IFR runways on Airport Layout Plans (ALP), but can actually refer to any SIAP request known by the specialist.

(2) Other examples of proposed SIAPs may be precision runways on a reviewed Airport Layout Plan (ALP), Airport Master Plan (AMP), a planned navaid installation under the facilities & equipment (F&E) budget process, an Airports Division funded airport improvement project, a non-rule making action (NRA) case, or any proposed action that is otherwise documented and known by the specialist. However, the designation of a precision instrument runway is not sufficient alone to generate precision approach protection. Plans must be supported by installation (within the near future) of the necessary equipment to support the approach.

(3) Common sense and good judgement should apply so as not to overprotect for all possible non-precision SIAPs. Because a runway is shown on an ALP as non-precision instrument (NPI) is not justification for protecting all possible facility site locations for all types of navaids. This type of evaluation is just not possible. However, specific written requests are not always required for additional non-precision approaches to runways based on existing navaids.

(4) Protection for new technology SIAPs like long range navigation (LORAN) or global positioning system (GPS) require a specific written request that the FPO has approved or plans

to approve. Or, the airport/heliport must be designated on an FAA procedure implementation list and the specific runway(s) must also be listed so that the final approach course or runway alignment is known.

(5) Departure evaluations must be considered for VFR airports/heliports that will become IFR based on a proposed procedure. This evaluation may require the performance of a complete departure analysis to determine what the takeoff minimums and/or departure procedure would be, prior to and in conjunction with, the evaluation based on the proposal.

(6) The comment period for circulated OE proposals may surface a need for a procedure. Changes to Order 7400.2 may be forthcoming on the definition of a proposed procedure or a plan on file. For the FPO, the major point is that the OE specialist must know that there exists a need for a terminal instrument procedure before any actions can be taken to protect the necessary airspace.

**d. Air Carrier Operations**

During obstruction evaluations, the specialist must be knowledgeable of airports/heliports with present or planned air carrier activity.

(1) Airlines perform their own obstruction studies to comply with regulations regarding obstruction clearance and aircraft performance. FAR Sections 121.189 and 135.398 describe some of the requirements of this nature, which may result in load limitations for the aircraft.

(2) At the time of this writing, discussions are underway to decide whether air carrier operations concerning emergency operations; i.e. engine failure during take-off, are a subject to be addressed during the OE process. At the present time, FPO OE specialists are not required to consider these situations in the OE process.

**e. Special Routes and FAR Part 95 Direct Routes**

Consider the special routes that are part of an air carrier's operations specifications (OpSpecs) and other direct routes, which are not charted. Although most of these routes may be in the high altitude structure, some may have low MEA's which definitely could be affected by new construction. Each OE specialist should maintain a list of these routes for their use.

**558. THE OBSTRUCTION EVALUATION (OE)**

Usually the FPO receives an OE case from the regional Air Traffic Airspace Branch via an FAA Form 7460-1, Notice of Proposed Construction or Alteration. Accompanying the FAA Form 7460-1 may be other information to more clearly explain the intent of the proposal and location. The case may include, for example, a regional Air Traffic (AT) worksheet and a copy of a sectional chart, quad chart, Airport Layout Plan (ALP), Airport Obstruction Chart (OC), or any

other type drawing with the obstacle plotted. In 1999, the introduction of Air Traffic's automated OE program changes the way the FPO receives OE cases. Some regions may receive no paperwork at all. The only information received is an automated 7460-1 form received from AT on the OE specialists computer. It may be necessary for the OE specialist to plot the proposal on a sectional chart to determine it the OE proposal may impact other airports than that listed on the automated 7460 form. Some regions require that AT provide a copy of a sectional marked with the proposal. Due to the high numbers of OE cases received by the FPO OE specialist, time and resources may not permit the specialist to plot each case. This additional submission of the sectional is a local agreement between the regional AT and FPO office.

**a. Obstruction Evaluation Items**
The following paragraphs are expanded explanations of each item on the OE job aid (see figure 5-1). Shortcuts, "rule-of-thumb", helpful hints and reminders, common errors, and automation aids are explained where appropriate.

**b. Criteria and Safety**
TERPS and other criteria (FAR, orders, etc. ) may not be explained in detail but appropriate references are included. If there is a safety issue that becomes apparent to the OE specialist but is not covered by the job aid, it is the specialist's responsibility to include an appropriate comment in their response to AT.

**559. ALTITUDE/HEIGHT VERIFICATION**
The mean sea level (MSL) height should be checked by verifying the simple addition of the site elevation and the obstacle height above ground level (AGL). The site elevation can sometimes be checked by referring to contour lines on a quad chart or it may be available from additional data which AT may have submitted. Note whether dimensions are in feet or meters. An accuracy coding determination should be made. Accuracy standards are contained in Order 8260.19, Flight Procedures and Airspace.

**560. SCREENING**
Although not an item on the worksheet, a quick inspection of the proposal, along with the OE specialist's intimate knowledge of the area, may eliminate the need for further evaluation. Many OE cases can be evaluated very quickly by initial screening.

**a. Manual Screening**
Many of the obstacle's effects can be determined by plotting the location on a sectional chart. Once the obstacle is plotted, a number of things can be evaluated based on knowledge of the area.

(1) Sometimes an OE proposal will have an MSL elevation that is below nearby IFR airports/heliports. This will likely have no effect to SIAPs at those airports/heliports.

(2) If the obstacle is not within 6 NM of an airway, there will usually be no airway effect. Turning areas and airway splay, if the airway is over 51 NM from a facility, are examples when 6 NM are exceeded. In the airway secondary area, the required obstruction clearance (ROC) is at least 500 feet less than the primary. This reduced ROC is usually sufficient to rule out any effect. Dividers may be used to measure rough distances.

(3) If a charted obstacle of equal or greater MSL height lies within 4 NM of the same airway segment, there should be no additional effect on that airway.

(4) If a charted obstacle of equal or greater height lies in a straight line between the proposal and an airport/heliport, then the obstruction is shielded and usually there would be no effect on the SIAPs at that airport/heliport. An exception to shielding may be if the airport/heliport has an arc initial segment.

(5) Many IFR airports/heliports can be identified easily on sectional charts by the 700 foot floor of controlled airspace shown by the magenta colored IFR airspace. If the proposal is more than 30 NM from the nearest IFR airport, then usually there will be no effect on SIAPs to that airport.

(6) Special attention must be given to very tall proposals. The more familiar a specialist is with the area of evaluation the more comprehensive the screening can be. For example, a tall obstacle may not be identified as a problem using the previous examples but could have an effect on long transition routes, uncharted airways, or departures at an airport/heliport many miles away.

**b. Automation Screening**
Preliminary Regional Obstacle Screening Evaluator (PROSE) , is a useful but uncertified tool used for screening. In essence, this program accomplishes the manual IFR screening listed above. Plotting the obstruction on a sectional chart for quick visual screening is still recommended.

**561. EN ROUTE IFR OPERATIONS**
Reference: FAR Section 77.23(a)(4). When the screening step indicates that there may be an effect on enroute operations, the specialist must determine exactly what that effect is. The FPO is charged with the responsibility to identify the effect on minimum enroute altitude (MEA) , minimum obstruction clearance altitude (MOCA), minimum crossing altitude (MCA), minimum holding altitude (MHA), turning areas, and sometimes Minimum Vectoring Altitudes (MVA) and Minimum IFR Altitudes (MIA).

**a. Airways**
Reference: Order 8260. 19, Chapter 3, En Route Procedures. The evaluation must be accomplished for FAR Part 95 routes (airways and direct routes) and routes not covered by FAR Part 95.

(1) FAR Part 95 routes are those that are charted on enroute low Altitude IFR charts and also those that are not publicly charted but have been published in the federal register as a FAR Part 95 route.

(2) Routes not covered by FAR Part 95 (known as off-airway routes) are those routes where a portion is through uncontrolled airspace or use private facilities and have been developed for specific users using standard TERPS enroute criteria.

(3) A list of FAR Part 95 routes and altitudes (airways and direct routes) may be found in the semi-annual consolidation of Part 95 routes entitled “Minimum Enroute IFR Altitudes Over Particular Routes and Intersections”. In addition a master list is maintained by the National Flight Data Center (NFDC). The Air Route Traffic Control Center (ARTCC) keeps a list of direct routes and the Flight Procedures Development Branch has a list of routes in their area of responsibility.

(4) All airways and direct routes are to be evaluated using the criteria of TERPS, Chapter 17. Where criteria require that an airway be at least 1500 feet above terrain, a quick rule-of-thumb is that any obstacle less than 500 feet AGL will have no effect an any airway MOCA. A specialist must be very familiar with his/her area to use this rule-of-thumb because some sections of the country have large areas of airspace with a 700-foot airspace floor and mountainous terrain.

(5) Particular attention should be given to those obstacles that lie within 4 NM of the centerline of an airway segment and are beyond an MEA change point but would be a penetration to the climb gradient to the new MEA even though there is no effect on the MEA of the new segment. This would cause an increase to a MCA or require an MCA to be established where there was not a MCA previously.

**b. Holding**
If an obstacle is near a fix, determine if holding is authorized at that fix. This information is available on the FAA Form 8260-2, Radio Fix and Holding Data Record, and may or may not be published on the enroute chart. Holding pattern airspace is larger than that protected by enroute criteria and has a similar 2 NM secondary area. Do not forget holding secondary areas when using the holding area templates. Also, some holding patterns have a MHA that is lower than the associated MEA of the airway. Each FPO should maintain a list of those unusual holding situations.

**c. MVA/MIA**

Criteria for evaluating MVA/MIA charts are found in Order 8260.19, Chapter 3, Section 7, and are classified as enroute subjects, whereas Order 7400.2 lists MVA under the heading of terminal area IFR operations. Enroute obstacle clearance criteria apply to both MVAs and MIAs and are grouped here because of this similarity. Air Traffic Facility Management, Order 7210.3, is the base order governing MVA charts. Report MVA effects as terminal effects under FAR Section 77.23(a) (3) and MIA effects as enroute effects under FAR Section 77.23(a)(4).

(1) Each ATC tower or approach control develops its own MVA chart and is responsible for keeping it updated. Each ARTCC develops its own MIA chart and is responsible for keeping it updated. The FPO involvement with MVA/MIA charts is as a quality control office for the determination of accuracy in obstruction clearance.

(2) The regional AT division has the responsibility to forward to the FPO a current copy of the MVA/MIA chart and associated information for the FPO OE specialist to accomplish the evaluation. The MVA/MIA chart should be drawn on a sectional chart and be accompanied by FAA Forms 7210-7 (MVA) or 7210-9 (MIA) for documenting controlling obstructions in accordance with Orders 7210.3 and 8260.19.

(3) The terminal area chart may be useful in the evaluation. The proposed structure may be plotted directly on the MVA/MIA chart. Add 1000 feet ROC (the ROC may be higher than 1000 feet in areas of designated mountainous terrain), to the proposed MSL of the obstacle and compare the result to the MVA/MIA chart altitude for that area. Another method is to check the height of the controlling obstruction on the FAA Forms 7210-7 or 7210-9 to see if the proposal is higher.

(4) For MVAs, if an obstacle is within 40 NM of the radar antenna and is within 3 NM of an area boundary, the adjacent area would be affected. All areas have a 3 NM buffer. Draw a 3 NM ring around the obstacle. That part of the ring that may intersect a lower altitude area would need to be raised which causes an effect on the MVA chart.

(5) Likewise, if an obstruction is close to but not exactly on an existing area protected by 3 NM ring, the new obstruction would need it's own 3 NM ring (or the whole area MVA would need to be raised) which would change the shape of that protected area. This would be an MVA effect, however slight.

(6) If an obstruction is beyond 40 NM from the radar antenna, the MVA 3 NM ring expands to a 5 NM ring and this extrapolates to a 5 NM buffer around sector boundaries beyond 40 NM on the chart. The same 5 NM boundary buffer is used for MIAs.

**d. Automation Tools**
PROSE, TERPS Calculator, other home grown geodetic calculators, and IAPA are examples of automation tools available to the OE specialist.

(1) When PROSE alerts "may exceed" the OE specialist should identify whether closer evaluation is needed.

(2) TERPS calculator (see preceding section of this chapter), has an airway program that can be used as a tool to ascertain the exact distance a proposal's coordinates are from the centerline of a published airway radial. Also if the obstruction is in the secondary area, this program provides an uncorrected MEA/MOCA using the appropriate ROC.

(3) TERPS calculator also has a program to analyze holding patterns and radar MVA charts.

(4) The geodetic calculator mode of IAPA is another tool that can be used to determine a proposal's distance from centerline of an airway. The specialist must first calculate the direct route between navaids to determine the exact airway centerline. For dogleg airways, the courses will be a full 15 degrees from another airway at the facility or be a whole true radial from a facility. This exact route centerline is adjusted for variation and rounded to the nearest whole number before it is published on airway charts. Therefore, the radials and distances published on IFR charts are not useful for exact geodetic calculations. The specialist will need to calculate the ROC if the proposal's distance is between 4 and 6 NM from airway centerline.

**562. TERMINAL AREA IFR OPERATIONS**
Reference: FAR Section 77.23(a) (3). Terminal area IFR operations include terminal routes, approach areas, departure area, and circling approach area. The FPO evaluates all proposed obstructions using TERPS criteria referencing terminal instrument procedures for which 8260 series forms and other information are available. This includes all FAR Part 97 Standard Instrument Approach Procedures (SIAP), special IAPs, and military IAPs for which the FAA is responsible. The Army, Navy, and Air Force receive and review some of the OE cases in order to protect their air operations. FAA responsibility is only for those military IAPs developed and maintained by AVN, which include Army IAPs, and military IAPs at joint civil/military use (usually Air Force) airports.

**a. Standard Terminal Arrival Routes (STARs)**
OE effects on STARs are the responsibility of the FPO. STARs are developed by Air Traffic, with AVN signoff necessary. STARs are considered to be an enroute procedure. The OE specialist shall evaluate the effects of the proposal on the minimum altitudes published. Enroute TERPS criteria apply. If a route segment minimum altitude is affected, assure that the next segment

descent gradient is not excessive and respond to AT the FAR Section 77.23(a)(3) effect.

**b. Approach Segments**

The approach from entry to landing can be broken into three segments: Terminal/initial/feeder, intermediate, and final. The missed approach segment, is a separate entry on the checklist and is covered separately in this section. Each segment has a different ROC. The specialist should refer to the FAA Form 8260-9 for each approach affected to determine if the obstruction would cause an increase in a minimum altitude or become the controlling obstruction in any approach segment. If there is an increase in any approach segment minimum altitude it must be reported to AT as exceeding the standards of FAR Section 77.23(a)(3). One way to determine if an obstacle will cause an increase in a minimum altitude is to add the MSL height of the obstacle to the ROC plus any adjustments. Compare this figure to the charted minimum altitude. If it is higher than the charted altitude, it exceeds FAR Section 77.23(a)(3). If it is not higher than the charted altitude but higher than the noted controlling obstruction on the FAA Form 8260-9, then AT should be notified of this fact and requested to require the proponent to give supplemental notice by FAA Form 7460-2, Notice of Actual Construction or Alteration. Use the SIAP graphic, if possible, to visually determine if the obstruction may lay within the area boundaries of an approach segment. The obstruction can then be plotted. Plotting is difficult on an IAPA graphic, so a sectional should be used. Also, some of the older IAPA generated SIAPs were submitted to the FPO without a completed FAA Form 8260-9. Evaluating a proposal accurately without FAA Form 8260-9 information is time consuming. The responsible Flight Procedures Development Branch should be requested to supply completed FAA Form 8260-9s to the FPO for all SIAPS.

**1. Terminal/Initial Segments**

These segments generally have a ROC of 1000 feet except in mountainous areas or the secondary area of protection. Refer to Order 8260.19, paragraph 807, Terminal Routes. Any increase in these segment altitudes will require a descent gradient check in the succeeding segment. Also see TERPS table 1A for altitude limitations for procedure turns. Any increase of segment descent gradient above optimum is an FAR Section 77.23 (a) (3) effect.

**a. Feeder Route Segments**

For criteria, the reference is TERPS paragraph 220. Identification and determination of the effect of a proposed obstacle on feeder routes may be difficult without the aid of automation. The 500 foot AGL airway rule-of -thumb may apply. This could remove most OE cases from further consideration on feeder routes. If the determination is made that further evaluation is needed for possible feeder effects,

SIAPs at all airports within feeder range need to he evaluated. Further screening can be accomplished by noting an estimated direction and distance a proposed obstruction is from an airport and consulting the approach plates for feeder routes and altitudes. The FAA Form 8260-9 is not very helpful in this screening. Once it has been determined that an obstacle might have an effect on a feeder route, that route should be plotted on a sectional chart along with the obstacle and then enroute obstacle clearance criteria must be applied to determine the exact effect, if any, that the case would have. Caution must be taken to apply the correct route width and secondary ROC requirements when a feeder uses a nondirectional beacon (NDB) for positive course guidance. These criteria are contained in TERPS, chapter 17, paragraph 1750.

**b. Initial Segments**

Reference: TERPS Chapter 2, Section 3. An initial approach may be an arc, radial, course, heading, radar vector (or a combination thereof), or a procedure turn or holding pattern in lieu of procedure turn. Dead reckoning or heading segments without positive course guidance are wider than airways. Except for procedure turns and holding patterns, the FAA Form 8260-9 is of little use in identifying if the obstacle is within the area confines of an initial segment. The approach plate should be consulted to identify the general area of the initial segments. If the obstacle is in the general area, the initial segments may need to be plotted on a sectional chart and evaluated. If close to segment boundaries, higher scale maps or automation use may be required.

**c. Feeder/Initial Automation Tools**

PROSE can be used to great advantage in this phase of evaluation. When PROSE alerts, "may exceed”, it has identified a need for the specialist to take a closer look at the terminal routes for the airport. This information makes it easier to review the plates for a possible effect. PROSE has also identified those and only those airports where a terminal route may be affected. This narrows down the search area. The TERPS Calculator has programs that can be used to evaluate a specific obstacle's effect on procedure turn areas and holding patterns, and the airway program can often be used to evaluate feeder routes. IAPA has the capability for determining minimum altitudes based upon a specific proposed obstacle entered in the system. The geodetic calculator mode of IAPA can also be

used to find the distance from an obstacle's coordinates to the centerline of a feeder route or initial.

**2. Intermediate Segment**

The intermediate approach segment blends the initial approach segment into the final approach segment. Refer to TERPS, chapter 2, section 4 for an in-depth discussion of the intermediate segment.

**a. Intermediate Segment Evaluation**

On-airport facility, No Final Approach Fix (No FAF) SIAPs do not have an intermediate segment. Intermediate ROC is 500 feet in the primary area, and 500 feet at the inner edge tapering to zero at the outer edge of the secondary area. To evaluate the intermediate segment, the obstacle must be plotted on each applicable SIAP graphic and a determination made as to whether it is within the area confines of the intermediate segment. Some close cases may require that the Flight Procedures Development Branch plot the proposed obstruction's coordinates on the official SIAP quadrangle chart. The proposal has an FAR Section 77.23 (a)(3) effect if it lies within the intermediate area and the obstruction MSL elevation plus ROC and adjustments rounded to the nearest 100-foot increment is higher than the published intermediate altitude. This is usually a one line entry on the FAA Form 8260-9 that has an intermediate segment. The controlling obstruction and ROC is listed on this line.

**b. Intermediate Increases Affect Final**

Unless there is a fix between the obstruction and the FAF, any increase to the intermediate altitude is a corresponding increase to the FAF altitude. If the proposed obstruction increases the intermediate altitude and hence the FAF altitude, the final approach segment needs to be assessed to determine the effect on the descent gradient, or possibly the minimum descent altitude (MDA) (reference: TERPS paragraph 252). Although an increase in the intermediate altitude is an FAR Section 77.23(a)(3) effect, AT usually does not consider this to be significant or a substantial adverse effect if it is the ONLY effect. The final descent gradient is computed from the FAF altitude to the touchdown zone elevation for straight-in approaches and from the FAF altitude to the circling MDA for a circling only SIAPs. An altitude increase in the intermediate segment may cause a final MDA increase (for circling only SIAPs) or the loss of straight-in minimums, due to a final segment rate of descent exceeding the

maximum allowed. Also, any final approach descent gradient above optimum is considered an adverse effect.

**c. Intermediate Automation Tools**
When PROSE alerts "may exceed" an evaluation of intermediate segments must be accomplished. TERPS calculator has a program to evaluate the impact an obstruction may have on an intermediate area. IAPA or the intermediate area drawn on a quad chart are other vehicles that can provide a definitive answer for intermediate segment effects. The information from out and over (tangent) programs of various geodetic calculators can also be used to mathematically determine if the obstruction is in the intermediate area.

**3. Final Approach Segment**
Reference: TERPS paragraph 250. Final approach segments vary and applicable TERPS criteria are contained in chapters designated for specific navigation facilities.

**a. Non-Precision Final Approach Segment Evaluation**
Plot the proposed obstacle on the SIAP graphic; if SIAP graphic is not available, construct a graphic based on the charted procedure. If it is within the confines of the final approach segment, refer to the FAA Form 8260-9. If the MSL height of the obstacle is higher than the controlling obstruction as listed on the FAA Form 8260-9 (and the full final ROC was used meaning the controlling obstruction is in the primary area), add the ROC and any adjustments to the MSL height of the proposed obstacle and round to the next higher 20 foot increment. Compare this new figure with the charted MDA. If it is greater, the proposed obstruction exceeds FAR Section 77.23(a)(3). Another method is to compare the obstruction's MSL height to the missed approach elevation (item #3 on the front of the FAA Form 8260-9). Examples of FAA Form 8260-9 can be found in Order 8260.19, Appendix 9. If it is greater, there will be an increase in the MDA. Although final approach segment areas vary, there are some particulars that need to be kept in mind.

(1) The length of final for an on-airport facility/no FAF SIAP is normally 10 NM. The final approach segment outer limit begins 10 NM from the facility with no fix error. The inner limit ends at the facility with no fix error.

(2) A step-down fix within the final area will have a fix error that may need to be computed. The obstruction is considered to be in the inner area (that closest to the runway) and is the determining factor in the step-down MDA, if it is closer to the runway than the most outer limit of the stepdown fix error.

(3) An obstruction in the outer final area (that area outside the inner area) may affect the charted MDA when not using the stepdown fix. If one or two sets of MDAs are charted, the charted minimum altitude at the stepdown fix will increase and the descent gradient for the inner area will increase.

(4) TERPS paragraph 289, concerning 7:1 driftdown, is NOT applicable to OE studies. It is criteria to be used only for existing obstacles. Exceptions to this may be exercised when there is an existing paragraph 289 obstacle. See paragraph 543 of this handbook for examples of such an exception.

(5) The outer limit of a final approach segment that has a FAF begins at the facility (if overheading the facility) which identifies the FAF, except for a fan marker. A FAF identified as a fix formed by a DME, fan marker, radar fix, area navigation (RNAV) waypoint, or intersecting radial or bearing has an associated fix error and the outer limit of the final approach segment area is extended prior to the FAF by the amount of the fix error. Use caution when a FAF is made up with more than one fix error; the most restrictive or greater error must be applied.

(6) The inner limit of the final approach segment area normally ends at or abeam the runway for approaches where the missed approach point (MAP) is predicated upon timing from the FAF. Where the MAP is identified by a fan marker, DME fix, or RNAV waypoint, the fix error must be extended beyond the runway end or MAP, as applicable, and that becomes the inner limit for the final approach segment area. The MAP for a no FAF final is at the facility which may be well beyond the runway end.

(7) Under certain conditions excessive FAF fix error may add to the MAP fix error, see TERPS paragraph 287c.

(8) The ROC in the primary area varies depending upon the type of SIAP. The applicable chapter of TERPS applies. The ROC is also on the FAA Form 8260-9.

(9) Except for airport surveillance radar (ASR) approaches, all final areas have a secondary area where the ROC tapers or slopes from the primary ROC at the outer edge of the primary to the outer edge of the secondary.

**b. Precision Final Approach Segment Evaluation**
For a 3 degree glide slope, the obstacle identification surface (OIS) for an ILS can be roughly summed up as a 34:1 obstacle clearance plane extending outward along the centerline from a point 975 feet prior to the ground point of intercept (GPI) beginning at the threshold height. A 5000 foot 7:1 transition area extends outside the primary area. MLS criteria differs, and in order to evaluate an ILS, it is necessary to determine which criteria was used to develop or revise the SIAP. At present, current guidance directs that all new ILS's be developed to the new MLS criteria. An OC chart is useful in evaluating the close-in ILS area. Transparencies or templates made to the OC scale with boundaries of ILS CAT II/ III missed approach area, (reference: AC 120-29, paragraph 8), ILS section 1 missed approach area, (reference: TERPS paragraph 942a.), and Zone 1 departure area, (reference: TERPS paragraph 1202a.), are helpful overlay tools to determine if a proposed obstacle lies within the subject boundaries on an OC chart.

**c. Final Segment Automation Tools.**

(1) PROSE gives messages that alert the specialist to check the final approach for penetrations to the FAR Section 77.23(a)(3) standard. The specialist needs to check for possible penetrations of the final segment.

(2) The TERPS calculator does final approach calculations for all types of approaches, both non-precision and precision. The limitations of the program must be taken into consideration when interpreting the answers provided by the TERPS calculator. For example, the length of the final approach segment from the FAF to the MAP is not considered in the answer and the

proposed obstruction may not be within the fore/aft confines of the actual final approach area. If the TERPS calculator is being used to evaluate an obstruction, then it would be wise to evaluate a proposal near the final approach area by using both the ILS and MLS programs. The ILS program evaluates the 34: 1 slope, and uses a calculated ROC to determine a no exceed height (NEH) for the glide slope. (The TERPS calculator program uses the acronym MTA, maximum to avoid, rather than NEH.) If the cases are loaded into the PROSE program, the data will not have to be reloaded into the TERPS Calculator since this program uses the PROSE database. This avoids having to manually enter all the data for each TERPS calculator operation; just enter the file and OE case number.

(3) The Geodetic Calculator has a program to calculate fix error and gives a graphic printout of the answer to help visualize the answer.

(4) IAPA is another automation tool that can be used to determine exactly what effect a proposed obstruction may have on a SIAP. However, it may require building a new workfile. But it may be worth the effort when a proposal has multiple effects (different SIAPs, final, circling, missed approach, etc.).

**4.Missed Approach Segment**

Reference: TERPS Chapter 2, Section 7 and Chapter 9, Section 4. Missed approach evaluations have a tendency to become complicated. A straight ahead missed approach is relatively simple. However, an immediate turning missed approach or a short straight climb section followed by one or more turns, creates a complex area and evaluation process. A good SIAP graphic is helpful to visually determine if the obstacle is in the missed approach area of protection. Often it is necessary to manually plot or request the Flight Procedures Development Branch to plot the obstruction on the quad chart in order to determine if it is within the area and the exact effects.

**a. Missed Approach Segment Evaluation**

Normally, the missed approach surface is a 40:1 slope starting at the MAP at the height of the missed approach surface (HMAS). The surface evaluation begins over the MAP at a height (HMAS) determined by subtracting the final approach ROC and adjustments from the MDA/DH (The HMAS can be found on the front of FAA Form 8260-9 in item number 3). Care must be taken to assure the 40:1

slope starts at the MAP or starts beyond the MAP required by the final criteria. Proposed obstructions that plot a short distance beyond the MAP are easy to figure. Divide the slope distance by 40 and add the answer to the HMAS. This will give the maximum MSL height for the obstruction without causing an increase to the MDA. MLS missed approach areas are different from ILS missed approach areas. Three missed approach slopes have to be used. These may change depending on the distance from the plotted MAP.

**b. Missed Approach Segment Automation Tools**
PROSE gives messages that provide an alert for this segment. When the OE specialist receives such an alert, further manual evaluation is necessary to determine the impact.

(1) TERPS calculator makes an evaluation of the missed approach area in all modes. Out and over (tangent) information is supplied by the TERPS calculator and this information can aid in manually analyzing the missed approach area. Most missed approach penetrations need to be manually analyzed.

(2) Other geodetic calculators with an out and over program can also be used to mathematically evaluate the proposal.

(3) IAPA computes the effect of an obstacle on the MDA. MDA adjustments are required if there is any effect. Using IAPA, the final must be developed (to determine the MAP, width of final at the MAP, missed approach elevation, and the straight-in MDAs). Circling must be developed if straight-in is not authorized (to determine the MAP elevation and circling MDAs), and then, the missed approach can be developed.

**5. CAT II/III ILS Missed Approach**
Reference: AC 120-29, appendix 2, paragraphs 7, 8, & 9. The areas of concern are the touchdown area, touchdown area transitional surface, and missed approach area. These areas are distinctly different from any other TERPS areas.

**a. CAT II/III ILS Missed Approach Evaluation**
The best way to check if a proposed obstruction is within the lateral confines of the areas is to plot the obstruction on an OC chart (Accuracy standards may have to be applied). Measure the distance of the obstruction from the centerline of the runway and from the

approach end of the runway. A transparency or template with these areas drawn on them is helpful in speeding the evaluation. No penetrations of the applicable primary surfaces are allowed and CAT III ILS minimums are denied if any surface is penetrated. The criteria only provide for adjustments to CAT II visibility minimums when the transitional surface is penetrated.

**b. CAT II/III ILS Missed Approach Automation Tools**
There is no specific PROSE alert for CAT II/III missed approach. TERPS calculator used in the ILS mode does evaluates the CAT II/III touchdown area, touchdown area transitional area, and section 1 of the missed approach area. Note that CAT II/III criteria allow climb gradients to be specified in the missed approach. The evaluation must consider existing specified climb gradients.

**6. Proposed Instrument Approach Procedures**
Reference: Order 7400.2, paragraph 7-3. A proposed obstruction may have an adverse effect on future IFR operations indicated by a plan on file.

**a. Proposed SIAP Evaluation**
All proposed SIAPs need to have their assumed minimums and departure procedures protected from degradation. Each FPO shall keep a record of all proposed SIAPs or plans on file and assure that they are considered in each obstruction evaluation. In some cases the proposed SIAP has already been developed and the proposal's effects on segments can be evaluated based on the already determined minimums. At other times, the plan is only in a conceptual stage and no minimums or final approach courses have been assigned. An evaluation in this instance must use the most probable approach and nominal criteria. Then compare the proposed obstruction with existing obstructions. If the proposed obstruction's MSL height is greater than existing controlling obstructions and a segment altitude would increase, then an FAR Section 77.23(a)(3) effect would occur. Common sense and good judgement should apply, especially if there is uncertainty in airport data (runway end coordinates, etc.).

**b. Proposed SIAP Automation Tools**
Provided the database has been constructed, PROSE can identify airports/heliports that have

plans on file for an original SIAP. This is particularly helpful in the screening process since airports/heliports without a SIAP are not identified as IFR with magenta airspace and in initial screening, do not appear to be a problem when a proposed obstruction is plotted on a sectional chart. New SIAP proposals can be added to the PROSE airport database with nominal airspace values that will be sure to alert the specialist when a proposed obstruction is near a proposed IFR airport. TERPS calculator can be used to evaluate a proposed obstruction regarding a proposed SIAP almost as easily as an existing SIAP if airport data is available. IAPA can be used to build a workfile for a new SIAP and determine if a proposed obstruction would be a controlling obstruction.

**c. Procedural Adjustments**

Reference: Order 7400.2, paragraph 5-11b(5). "if the structure will affect an instrument flight procedure, provide a statement as to what adjustments can be made to the procedure/structure to eliminate the adverse effects." The FPOs compliance with the referenced paragraph is normally limited to a no exceed height (NEH) for the structure, the increase in minimums, and the FAR Part 77 section affected. An NEH height, which may include an appropriate allowance for accuracy, shall be given for all FAR Section 7.23(a)(3)&(4) adverse effects. The following are some other obstacle and procedure adjustment factors.

(1) Occasionally, a proposed obstruction may be located at the very outer edge of a TERPS area of protection which would cause an adverse effect on a SIAP. The specialist should consider responding to AT on small movements of the obstruction such as moving a site 100 feet or less. Do not forget the 250 feet horizontal uncertainty, if applicable.

(2) If specifically requested by AT, the OE specialist can recommend a site relocation where the proposed obstruction would have no or limited effect at the same or amended MSL height. Normally, the proponent will have limited land available for the proposed structure. Occasionally, the proponent will have alternate sites and

discuss that fact with AT. The specialist will not evaluate alternate site locations as a normal course of action, but should be prepared to assist AT when requested, or participate in an AT sponsored meeting with the proponent. A proponent's contacts and visits directly with the FPO without AT involvement is neither appropriate nor encouraged.

(3) Occasionally, a proponent will submit multiple filings for a single structure and these filings may not be apparent to the AT specialist during his/her preliminary review. Reference: Order 7400.2, paragraph 5-4. Discussions with AT will be necessary to determine the reason for second or additional filings and AT, in turn, may have to contact the proponent. Whatever the reason, The FPO will not evaluate multiple filings on one structure unless a single refiling is, in fact, a new case based on the withdrawal of the original OE case or based on an imminent or actual hazard determination on the original case. If discussions with the AT OE specialist are not possible, multiple filings on a single structure will be returned to AT, without evaluation but with an appropriate explanation, for their handling.

(4) The OE specialist should be prepared to discuss with the proponent in an AT sponsored meeting any factors including changes to the proposed height or location of the obstruction. Changes to instrument procedures can also be discussed. The FPO policy on procedure changes is provided in the previous section, paragraph 542.

**c. Circling Area**

Reference: TERPS, paragraph 260. The circling areas of protection are incrementally increasing distances from the runways for each aircraft speed category published on the procedure. When the proposed obstacle is close to the airport, the circling area may be difficult to accurately evaluate without automation unless the obstacle can be plotted on an OC.

**1. Circling Area Evaluation**

If the obstacle is not obviously further from the airport than the maximum circling area and the obstruction's MSL height is greater than the lowest

(generally CAT A) controlling obstruction, a closer evaluation of the circling area is necessary.

(a) If the obstacle is on or near an airport with an OC chart, it may be accurately plotted and studied. The circling areas may need to be drawn on the OC chart to identify exactly in which circling category area the obstruction is located. Once the category is determined, compare the obstruction's MSL height to the controlling obstruction height, as found on the FAA Form 8260-9 part 4; if it is greater, add 300 feet ROC plus any adjustments to the MSL, round to the next higher 20 foot increment and compare to the charted MDA for that circling category. If the answer is greater, then the proposed obstruction exceeds FAR Section 77.23(a)(3) for that category.

(b) Check the higher categories for possible effect. For example, a proposed obstruction that affected CAT C circling MDA may also have an effect on CAT D and E MDAs because these areas also encompass CAT C.

(c) Where the circling MDA is controlled by the straight-in MDA or by TERPS table 11, it is possible for a proposed obstacle to be of greater height than the controlling obstruction listed on Form 8260-9 for that applicable circling category. In this case, the obstruction's MSL height plus 300 feet plus adjustments may not be greater than the charted MDA for that circling category and would not be an FAR 77.23(a)(3) effect.

**a. Circling Area Automation Tools.**

(1) PROSE makes an initial evaluation by comparing the proposed obstruction's MSL height with the lowest circling controlling obstruction and a distance from the airport reference point (ARP). If the proposal's MSL height is greater and the distance is less than the parameters, PROSE gives an alert.

(2) TERPS calculator has a circling program that accurately gives the circling category location for the proposed obstruction.

(3) Various geodetic programs can be used by the specialist to determine the proposal's distance from a runway.

(4) IAPA can also determine where the obstruction is in relation to the circling category areas and compute the MDA. In the automation reviews, the runway end coordinates must be known or be in a database, to compute the distances and give precise answers.

**d. IFR Departures**

Reference: TERPS chapter 12; Order 8260.40 section 4 (FMS); Order 8260.44 (RNAV). The effect of an obstacle on departures will depend on its location relative to a runway and application of the criteria. Evaluation requires determining what is the departure end of the runway (DER), what altitude to start the obstacle identification surface(s) (OIS) , applicable climb gradients and how are they computed, a takeoff minimum if required, an IFR departure procedure if required, and finally, how the evaluation is completed on this new obstacle if the runway currently has a takeoff minimum (especially with climb gradients) and an IFR departure procedure. Also see departure philosophies in the preceding section.

**1. TERPS Chapter 12: IFR Departure Zones**

(a) Zone 1 is a relatively small trapezoid extending 2 NM in the direction of the departure. The OIS begins at the departure end of the runway (DER) at the DER MSL elevation. TERPS allows the OIS to begin no higher than 35 feet above the DER elevation when establishing the need for FAR Part 97 IFR Takeoff Minimums and Departure Procedures. For obstruction evaluations, the DER elevation or the elevation (up to 35 feet above DER elevation) determined to negate existing obstructions is used. What this means is, to determine the effect of a proposed obstruction, the same criteria parameters used on existing obstructions must be used on the proposed obstructions.

(b) Zone 2 is a large area extending to the enroute environment. The OIS for Zone 2 begins at the height of the OIS at the end of Zone 1 and measurements to the proposed obstacle shall be made from the runway edge or edge of Zone 1, whichever is the shorter distance. The OIS height at the end of Zone 1 is always 303.8 feet (2 NM divided by 40) above the start elevation at the DER. Zone 2 OIS continues at 40:1 to the point where it reaches the minimum enroute altitude authorized.

(c) Zone 3 is a large area in the opposite direction from takeoff and extends to the

enroute environment. The OIS for Zone 3 begins 400 feet above the airport elevation and measurements to the proposed obstacle are made along the closest runway edge. The 400 feet is based on the assumption that departing aircraft will reach an altitude of at least 400 feet above the airport prior to exiting Zone 2. A 40:1 OIS is used starting at 400 feet.

**2. Departure Evaluations**

The determination of the height of the OIS at the proposal location is very difficult without automation. The accurate distances required for evaluation may be measured from a quad chart plot or in some instances, an OC chart. The OIS ends at the enroute altitude. This evaluation end point can be many miles from the airport. Departures can be rough screened on a sectional chart if the proposed obstruction is not in Zone 1. This rough screen is to measure the distance on a sectional chart from the runway end to the proposed obstruction plot, then divide that footage distance by 40, and add the runway elevation. If the obstruction's MSL height is less than that answer, there would probably be no effect. If the tangent data relative to the runway threshold are submitted with the OE case, the obstruction's location can be determined and the Zone 1 OIS height can be calculated. If the proposal's location data are only coordinates, then a geodetic calculator is needed to determine the exact out and over (tangent) information for the obstruction. Once the determination is made that the obstruction exceeds the departure criteria, it is necessary to develop an effect to give to AT. If the obstacle is in Zone 1, a ceiling and visibility restriction would be required. A climb gradient may be appropriate. For other zone penetrations, a departure procedure may suffice. A departure procedure should provide obstacle clearance in accordance with TERPS paragraph 1203. The assigned altitude before turning should be the results of criteria application and may equal to, or exceed the MSL height of the obstruction due to the required ROC of 48 feet per NM. The turning altitude shall be in 100-foot increments.

**3. Departure Automation Tools**

When PROSE alerts, "may exceed”, the specialist should manually screen for departure effect and then use the TERPS calculator when further evaluation is warranted. TERPS calculator gives an exact evaluation and tells in which departure zone the proposal is located, the NEH, and the minimum climb rate in feet per NM to clear the obstruction (The TERPS calculator program uses the acronym MTA, maximum to avoid, rather

than NEH). The NEH can then be compared to the proposed obstruction's MSL height and if greater, the proposal has an FAR Section 77.23(a)(3) effect. Any geodetic calculator with an out and over (tangent) program can be useful, but the mathematics to determine exact height of the OIS at the proposed obstruction site may be cumbersome when the proposal is not in Zone 1 or straight out from Zone 1. Requests for assistance from the Flight Procedures Development Branch may be required. IAPA does not have a certified program to evaluate departures at this time.

**4. FMS and RNAV Departures.**

(a) FMS departure procedures will normally be developed as Specials for use by air carriers or other FMS equipped aircraft. Refer to Order 8260.40 in conjunction with TERPS chapter 12 for evaluation criteria.

(b) RNAV departures, developed for GPS equipped aircraft and other aircraft with appropriate avionics. Refer to Order 8260.44 in conjunction with TERPS chapter 12 for evaluation criteria.

**5. Reporting the Effects**

**a. IFR Take-off Minimums (Ceiling and Visibility)**
FAR Part 91 and TERPS table 13 prescribe the standard civil take-off minimums in visibility only. If, due to obstructions penetrating the OIS, it becomes necessary to require higher than standard take-off minimums, the minimums shall be no less than ceiling 300 feet height above the airport (HAA) and 1 statute mile visibility (300-1). A ceiling/visibility of 300-1 or more will also be required when a route to miss the obstruction is not possible. A penetrating obstruction in Zone 1 or right after Zone 1 into Zone 2 and covered by both the left and right turning radius, is normally the location requiring the higher than standard take-off minimums. Another example is when other penetrating obstructions in the airport area may limit the routes that can be used in the departure and the proposed obstruction is located in the only obstacle free area remaining (like down the mountain valley or fjord).

**b. Establishing Ceilings**
A ceiling of 300 is the minimum ceiling even if the proposed obstruction is much less that 300 feet

HAA. If the proposal exceeds 300 feet HAA, a ceiling above 300 is appropriate and shall be established in 100 foot increments (400, 500, etc.). An assumption of obstruction overflight would require a ceiling at or above the top of the proposed obstruction and that ceiling shall be the effect. Common sense and good judgement should prevail especially if the proposal is several miles from the airport and in mountainous areas. The assumption of homogeneous weather, zero altimeter errors, and standard lapse rates are all implicit in TERPS, but may not be valid as the distance from the airport increases.

**c. Establishing Visibilities**

If a proposed obstruction penetrates an OIS and is within 1 statute mile of the departure runway, the minimum visibility to be established is 1 mile. Establishing a 1 mile visibility disallows the 1/2 mile visibility authorized by the FARs and the lower than standard takeoff minimums authorized for some carriers in their operations specifications. If the penetrating obstruction is more than 1 mile from the departure runway, establish 2 miles visibility when equal to or less than 2 statute miles, and if more than 2 statute miles, establish 3 miles visibility. Visibilities in excess of 3 miles (basic VFR) are not normally required assuming the proposed obstruction would be marked and lighted according to AC 70/7460-1, Obstruction Marking and Lighting. Again, common sense and good judgement should apply. Visibilities at the airport and 3 miles from the airport may be different. Local conditions must be considered and minimum visibility in excess of 3 miles may be appropriate.

**d. Establishing Climb Gradients**

Criteria are established to allow a climb gradient to be published for those aircraft capable of safely overflying an obstruction penetrating an OIS. TERPS specifies that anytime a climb gradient is published, ceiling and visibility minimums shall also be established for those aircraft that may not be able to maintain the climb gradient to the specified altitude. The pilot, while on the ground, can take all factors into consideration to determine if the aircraft can maintain the specified climb gradient or if the ceiling and visibility minimums must apply. A minimum climb expected on a standard departure is 200 feet per nautical mile. The 40:1 OIS equates to 152 feet per nautical mile creating a 48 feet per nautical mile buffer or ROC. When a climb gradient is to be

published, the ROC of 48 feet per nautical mile shall be used. Order 8260.19, Chapter 4, Section 7, provides pictorial guidance for computing climb gradients. The climb gradient shall be defined in feet per NM, followed by the altitude at which continued use of the climb gradient is no longer required. Many climb gradient examples are available in the published FAR Part 97 IFR Take-off Minimums and Departure Procedures.

**563. VFR OPERATIONS**
VFR operations, including VFR routes, VFR terminal operations (traffic patterns, etc.), are not a function of the FPO evaluation. This is a function of Flight Standards. Order 7400.2 requires Air Traffic to coordinate OEs with Flight Standards if AT considers that there may be a safety of flight or relevant VFR issue. If the FPO identifies a safety issue during its evaluation of an OE case, the specialist should refer the case to Flight Standards, or, in its response back to AT that there may be a Flight Standards interest.

**564. MINIMUM SAFE ALTITUDE (MSA)**
Another item on the job aid (OE/NRA Evaluation Checklist) figure 5-1, is MSAs and is listed as a reminder to accomplish this evaluation. Although Handbook 7400.2 does not recognize MSA as an instrument flight altitude, a proposed obstruction may cause an MSA or ESA to increase and require a change to the SIAP. If the FPO processes OE cases using PROSE, it is a simple matter to evaluate each day's batch of cases using the MSA-CK program. Building the database for the program is not very hard or time consuming. The advantage is knowing what procedures will have to be amended. Without using PROSE, a careful evaluation is required for possible effects on MSAs and ESAs. A 4 NM buffer is used around all segment boundaries.

**565 – 569. RESERVED.**

**Section 5. FPO RESPONSIBILITIES AFTER THE OBSTRUCTION EVALUATION**

**570. GENERAL**
The primary FPO responsibility after an obstruction evaluation is sending the response to Air Traffic (AT) on the results of the FPO analysis. After the initial response to AT, receipt of any 7460 series forms on the specific OE case can require additional actions by the OE specialist. The OE specialist's responsibilities to an OE case does not end until a final FAA determination is issued. Even after a regional determination is made, an appeal of that determination to Washington can cause additional FPO involvement with the case. This section will detail additional actions required of the OE specialist concerning individual OE cases up to the final determination, including Washington level reviews.

**571. RESPONSE TO AIR TRAFFIC**
Following a thorough obstruction evaluation, accurately communicating the FPO findings is required. The OE specialist is also responsible for informing AT of any FPO objections to the OE case. If The FPO

has no objections to the case, that information also must be understood by AT. This handbook encourages agreements between the FPO and regional AT on the form and wording of specialist responses to reduce unnecessary paperwork. Misunderstandings between the two offices concerning any The FPO objections is unacceptable.

**a. Response by Computer**
For those offices using the automated OE network, the FPO response space is available.

(1) If The FPO determines the case has effects on instrument procedures, a paper response should be made if the available space on the OE automated network is insufficient.

(2) Some FPO offices make all responses using the OE network, but follow up with a paper response for all cases that exceed standards, in order to fully describe the elements of the objection.

(3) This handbook will not dictate the method of response or format. After the OE automated network is fully developed and in use at all regions, appropriate policies may be established.

**b. Response by Form or Form Memo**
Over the years, many FPOs have established forms or form memos to respond to AT. Any agreed upon format between the FPO and regional AT is acceptable.

The form or the form memo must specifically state, if appropriate, by checking the appropriate block or by specific verbiage, that the FPO objects to the proposal.

**c. Verbal Response**
Verbal only responses are not encouraged because there is no permanent record of the FPO response. When verbally requested by the AT OE specialist, verbal responses may be appropriate if a follow-up computer or written response is made.

(1) One formal documented FPO response is required even if a case has been discussed and agreements made in a regional meeting or after a negotiation session with the proponent.

(2) After forwarding the formal FPO response, additional discussions and agreements may be made verbally.

**572. AIR TRAFFIC ACTIONS AFTER THE FPO RESPONSE**
The final determination of "hazard to aviation" versus "no hazard to aviation" is made by the focal OE office in the Air Traffic Division based upon the degree of the effects on aviation. That office makes the decision which situations have substantial adverse effect on aviation and which do not.

**a. Contents of the FPO Response and AT Actions**
In the response to AT, the condition/minimums, which currently exist and the condition/minimums, which would be required if the proposed construction occurs, should be clearly defined.

(1) If errors were found on existing procedures during the obstruction evaluation but the FPO still objects to the proposal, a more comprehensive response, explaining all details of the evaluation, is required. This is also true if minimums were raised based on a temporary obstruction and the airspace is still reserved for the lower minimums. The AT specialist must have a thorough understanding of the actual effects the proposal will have. All facts are needed to enable AT to make decisions, negotiate, and accurately write a determination.

(2) If the objectionable effects of the proposal are only based on accuracy coding, AT must be notified in the FPO response that a survey is needed. See paragraph 544 on accuracy coding.

(3) If a procedural change (like MSAs) will be required but the FPO does not object to the proposal, the response should request supplemental notice of actual construction.

(4) The no exceed height (NEH), the maximum height of the structure without having an adverse effect, should be stated. A NEH may be given for each effect the structure would have. This height gives the AT OE specialist the information necessary to negotiate with the proponent. The proponent may be persuaded to lower the structure to a lesser height in order to obtain a determination of no hazard.

(5) Some cases can affect more than one instrument procedure or more than one segment of a procedure. More than one NEH may exist and the AT specialist may discuss options with the OE specialist. This may occur prior to or after negotiations with the proponent. The FPO policy on procedure changes is stated in paragraph 542. Normally, the AT specialist understands this FPO policy, but the OE specialist shall determine which instrument procedure changes are appropriate and which are not.

(6) In some cases, procedural changes may be appropriate from an FPO viewpoint, but are not acceptable to AT. Disruption of normal air traffic flows is a prime example. These decisions are made by AT.

(7) In option discussions with AT, the OE specialist should suggest possible solutions based on the FPO areas of responsibility. Do not attempt to make decisions for AT. Conversely, do not permit AT to make FPO decisions.

**b. Negotiations with the Proponent**
Upon request, the OE specialist should assist the AT OE specialist with negotiations. Possible options, like movement of the structure, may be presented by the proponent. See paragraph 528 on negotiations.

**c. AT Decisions Based on Responses**
After the operational divisions have responded, AT will determine the next course of action. A determination may be made immediately or the case may be circularized for public comment. In response to AT, OE specialists can and should recommend circulation when the FPO evaluation indicates that benefits may be derived from public comment.

**573. FAA FORM 7460-8, AERONAUTICAL STUDY OF PROPOSED CONSTRUCTION OR ALTERATION.**

AT has its own parameters for deciding whether an OE case should be circularized. Proposed structures near an airport/heliport or towers higher that 500 feet AGL are examples commonly circularized. FAA Form 7460-8 is used for this purpose.

**a. Contents of Form**
Other than the basic information on the structure, the FAA Form 7460-8 will state the effects as reported by the operational divisions.

**b. OE Specialist Actions**
Upon receipt of the FAA Form 7460-8, the specialist should review the effects. If there are effects based on the FPO response, the accuracy of these effects should be checked. The specialist should also assure that there are no changes in location or structure height.

(1) Based on input, new information, or changes to the proposal, the specialist should reevaluate the proposal. This may be as simple as checking calculations or as complex as conducting another complete evaluation. The final adverse effects and recommendations should be determined.

(2) If an environmental analysis is required, have AT inform the proponent of what is required. If the proponent is unwilling to complete an analysis, a procedure change may not be considered. See paragraph 549 on procedural changes and environmental assessments.

(3) Most regional AT offices do not require another response from the FPO unless the effects noted in the original response change. Minor changes or minor inaccuracies discovered may be made verbally. Major changes require a formal response, especially when The FPO objection/no objection is reversed.

(4) The FAA Form 7460-8 should be filed in the OE case file.

**574. DETERMINATIONS: FAA FORM 7460-9, DETERMINATION OF NO HAZARD TO AIR NAVIGATION AND FAA FORM 7460-10, DETERMINATION OF HAZARD TO AIR NAVIGATION.**

Determinations are issued by AT based on the results of an internal FAA study and the circularized aeronautical study.

**a. FPO Policy on a No Hazard Determination**

The FPO policy is that the Air Traffic office shall coordinate with the FPO prior to release of an FAA Form 7460-9 (no hazard) when the FPO has an objection to the particular OE case. The preferred coordination method is the OE specialist's initials on a no hazard determination grid sheet.

(1) There are a number of reasons for this policy, but the policy stated in Order 7400.2, concerning the FAA speaking with one voice and that all internal disagreements will be resolved, is the primary reason.

(2) Commonly, discussions and eventual agreements occur between the AT OE specialist and the FPO OE specialist when The FPO objects to an OE case. The initials on the determination are written confirmation of the agreements.

(3) Coordination is not necessarily required when, through negotiations, the proposal was moved or lowered based on the FPO response or discussions. However, a change in the proposal differing from the FPO response and not discussed, may need further evaluation and shall be coordinated.

(4) The OE specialist shall not initial a no hazard determination until a requested survey is received and reviewed or a required environmental assessment is completed.

NOTE: on reviewing a proponent funded environmental assessment (EA) on a required procedure change, the OE specialist must assure the EA only addresses the government actions needed to accommodate the structure. Once accepted, the EA becomes an FAA EA. Also see chapter 10.

**b. OE Specialist Actions**

The FPO has no required coordination policy when a no hazard determination is issued and the FPO had no objections or when a hazard determination is issued. However, if extensive FPO comments are a part of the determination, The FPO recommends that AT coordinate with the OE specialist to ensure accurate explanation of the effects.

**1. Actions, No Hazard**

Issuing an FAA Form 7460-9 indicates that the structure may be built. The OE specialist should assume the structure will be built at the location and height stated on the form.

(a) The data on the structure should be checked. Changes may have occurred since the FAA Form 7460-1 was received. Any changes to the effects discovered by the specialist should be discussed with the AT OE specialist. Significant changes may require an amendment to the determination.

(b) If the location or height of the structure changed, a reevaluation of the proposal may he required. This is the time to determine all FPO effects, and not when construction actually begins.

(c) If a required environmental analysis was not completed, do not have AT issue a determination of no hazard.

**2. Actions, Hazard**
Issuing an FAA Form 7460-10 indicates that the structure probably will not be built. The OE specialist should assume the structure will not be built. Except for an environmental analysis, the OE specialist should take the same actions on a hazard determination as with a no hazard determination.

**575. CONSTRUCTION NOTICE: FAA FORM 7460-2, NOTICE OF ACTUAL CONSTRUCTION OR ALTERATION**

Receiving an FAA Form 7460-2 indicates that the structure is actually being built or construction will begin in the very near future. The OE specialist's actions may be many or few depending upon the effects the structure will have on aeronautical operations.

**a. Effects on Instrument Procedures**
The main concern of the OE specialist is rapidly rising structures where immediate action is needed to maintain instrument procedure safety margins as required by TERPS. For this reason, receipt of an FAA Form 7460-2 has the highest handling priority of any of the 7460 series forms.

(1) When the FAA Form 7460-2 is received, the air traffic office should forward any survey data received from the proponent to NOS for their use in assigning an accuracy code. A copy of the survey should have already been sent to the FPO for their review. The Flight Procedures Development Branch/FPO should use the previously determined accuracy code in procedural modifications and NOTAMs.

(2) Duplication of effort must be avoided. The FPO has already determined procedural effects the structure would have and that information should be shared with the Flight Procedures Development Branch.

**b. OE Specialist Actions.**

(1) Analyze the aeronautical effects based on the data specified on the FAA Form 7460-2. If there are no changes to the location or height of the structure, the aeronautical study and determination of effects should have been accomplished previously.

(a) If there are changes to the location or height of the structure, a review of the aeronautical study must be accomplished. Negotiated movement or height reductions may have occurred and the FAA Form 7460-2 may be the only indication to the OE specialist that the actual structure will have no effect or different effects.

(b) Normally, changes to the structure's location and height are the results of negotiations, but may due to the refinement of the data originally submitted by the proponent. Occasionally, a complete reevaluation of the effects will be required.

(2) Determine if procedural changes are required.

(a) If procedural changes are required, the OE specialist must take the appropriate actions to revise or amend the instrument procedures.

(b) For structures being constructed over a longer period of time, normal procedure amendments may be appropriate. The estimated completion time of the structure listed on the proponent's submitted FAA Form 7460-2 should indicate if amendments can be accomplished in a timely manner.

(c) Whether procedural changes are required or not, temporary construction cranes may affect instrument altitudes. Coordinate with the AT OE specialist as required to determine the extent of instrument procedures affected. AT in turn should coordinate with the proponent.

(3) Determine if a Notice to Airmen (NOTAM) is required.

(a) On rapidly rising structures and construction sites having temporary cranes, an OE case that affects instrument procedures will probably require immediate issuance of an FDC NOTAM.

(b) Because of the length of time required to amend and publish an instrument procedure, an FDC NOTAM may have to be issued even for slower rising structures. In this case, the NOTAM can be planned for future issuance.

(c) The Flight Procedures Development Branch or the FPO develops and issues any required FDC NOTAMs.

(4) If a procedure change is required, determine any environmental requirements.

(5) Determine if the procedure change requires further actions such as waivers or airspace.

(a) If a flight procedure waiver is required, initiate the waiver.

(b) If airspace action is required, coordinate with the Flight Procedures Development Branch and AT office for airspace action.

(6) Notify the Flight Procedures Development Branch for required procedural changes.

**576. WASHINGTON REVIEWS OF REGIONAL OE DETERMINATIONS**
Guidance on Washington office reviews are contained in Order 7400.2, chapter 8, section 5.

**a. What Can Be Reviewed**
All regional OE determinations, whether hazard or no hazard, may be petitioned for review.

(1) Commonly, the sponsor of a structure will petition a hazard determination while any interested party may petition a no hazard determination.

(2) AC 70/7460-1, Obstruction Marking and Lighting, deviation requests are also forwarded to Washington after the regional aeronautical study has been completed.

**b. Primary Washington Offices for Petitions**
The Airspace and Rules Division, ATA-400, is responsible for processing petitions for review of regional OE determinations. Like in the region, this focal Air Traffic office coordinates with the other operational services of Airway Facilities, Airports, Flight Standards and AVN. For the FPO, the appropriate Flight Procedures Development Branch, AVN-1XX, is the focal office.

**c. AT Actions**

(1) On receipt of a petition for review, ATA-400 assigns a docket number to the petition. More than one petition of the same case are given separate docket numbers (Although not written into the federal register, the Headquarters determinations are formally written in docket format).

(2) ATA-400 informs the appropriate offices, including the sponsor, that the determination is not final pending disposition of the petition.

(3) ATA-400 coordinates the petition and background information with the different operational services.

(4) Based upon the AT evaluation of the case and petition, including input from the other operational services, ATA-400 determines the best course of action for handling the petition.

(a) The normal decision will be to grant a review or not grant a review. Other options available are returning the case to the region for reevaluation and continued negotiations.

(b) Without a review, a regional determination may be affirmed and made final, revised and made final, or reversed and made final.

(5) If a review is granted, the case is essentially reopened for additional input and a complete reevaluation. Any and all aspects of the case are reviewed. A review is a time consuming process which may take months to reach a final determination.

(6) After the review, the regional determination may again be affirmed, revised, or reversed. Occasionally, the proponent or their representatives may offer options and the case may be returned to the region to finalize actions.

**d. Regional and Headquarters Actions**

(1) The general Washington level practice concerning petitions for review is to first determine if the petitioner has presented a valid reason for a review. Reasons for a review may be inaccuracies or untruths in the determination, not applying standard FAA policies and practices, and not meeting the provisions of FAR Part 77. However, even if the petitioner did not present a valid reason for a review, a review may still be granted or a determination reversed based on these same reasons. This is why petitions to Washington may be disposed of with or without a formal review.

(2) AVN-100’s involvement with a petition begins when the petition, the regional determination, and a cover letter from ATA-400 is forwarded to the National Flight Procedures Office (AVN-100). AVN-100 evaluates information presented by the petitioner, determines if the FPO area of responsibility effects listed in the

determination are correct, and analyzes other areas of concern that may need to be reviewed.

(3) During this initial evaluation, AVN-100 may call the FPO concerning any factors that may need to be explained. Discovering what appears to be an error normally precipitates the call.

(a) The regional OE specialist should not be concerned that one of their cases may be reviewed. Some proponents petition all unfavorable determinations. A petition for review is specifically addressed in FAR Part 77. Washington level evaluation is required.

(b) The regional OE specialist's evaluation and detailed response to AT, along with AT's discussions of these FPO effects in the OE determination, are very important to determine if a case review is appropriate. For this reason, precise evaluations and required coordination must be accomplished at the regional level for all OE cases.

(c) AVN-100 may request from the FPO, additional information on the case that is not available from the determination and published information.

(d) The OE specialist should refer to the case file when questions are posed by AVN-100. Any relevant information on the case should be volunteered besides the questions specifically asked.

(4) AVN-100 evaluates all The FPO aspects of the case. IAPA is commonly used for detailed TERPS evaluations.

(5) AVN-100 forwards a written response to ATA-400 stating that the FPO evaluation indicated that a review is appropriate or is not appropriate. If AVN-100 recommends a review, a detail of the reasons will be included.

(6) Actions to be taken by ATA-400 are coordinated with the appropriate operational services. If a review is granted, The FPO involvement continues. Prior to the review or during the review, meetings may be convened to discuss the case. Lawyers may be involved, both for the FAA and the petitioner. Any new information gained from the review is shared. AVN-100 will again respond to ATA-400 on their results of the formal review. Information should be detailed enough for ATA-400 to write the final determination. Coordination is accomplished prior to issuing the final determination.

**e. Overview of Washington Office Actions**

The Washington level actions on petitions for review of regional OE determinations are very similar to regional actions on the original case. The operational services evaluate the case and respond to a focal Air Traffic office. AT then determines the next course of action. Information may be sufficient for an immediate determination. The regional circulated aeronautical study can be compared to the formal Washington review when additional input is deemed appropriate. Based on all input, a final determination is made. All operational services agree with the final determination.

**577 – 599 RESERVED**

**FIGURE 5-1 (JOB AID)**

OE/NRA EVALUATION CHECKLIST

**CASE NUMBER** _____ - _____ - _____

**OBSTACLE TYPE** _____ **LAT/LON** _____-_____

**SITE ELEV**_____ **AGL HEIGHT** _____ **MSL ELEV**_____

| | EXCEEDS | DNE | NA |
|---|---|---|---|
| **1. AIRWAYS (mountainous yes___ no___)** | | | |
| **A. MEA**..... _____ | | | |
| **B. MOCA**..... _____ | | | |
| **2. RADAR VECTORING ALTITUDE CHARTS** | | | |
| **A. MVA**..... _____ | | | |
| **B. EOVM**..... _____ | | | |
| **C. MIA**..... _____ | | | |
| **3. STARs**..... _____ | | | |
| **4. INSTRUMENT APPROACH PROCEDURES** | | | |
| **A. CIRCLING AREAS**..... _____ | | | |
| **B. FINAL**..... _____ | | | |
| **(1) RASS**..... _____ | | | |

**(2) PRECIPITOUS TERRAIN.....**
_____

**(3) EXCESSIVE LENGTH OF FINAL.....**
_____

**C. INTERMEDIATE.....**
_____

**D. INITIAL.....**
_____

**E. MISSED APPROACH.....**
_____

**(1) MISSED APPROACH HOLDING.....**
_____

**F. PROCEDURE TURN OR HOLD IN LIEU.....**
_____

**G. FEEDERS (mountainous yes___ no___).....**
_____

**H. MSA's and ESAs ……..** _____

**I. SPECIALS, ASR/PAR, CAT II/III MISSED APCH…..**
_____

**IFR TAKE-OFF MINIMUMS AND DEPARTURE PROCS.**

**FIGURE 5-1**

**FIGURE 5-2 SAMPLE SITE SURVEY**

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Please Reply to: DONALD L. HAMLIN
P.O. Box 9 CONSULTING ENGINEERS, INC. Tel (802) 878-3956
Essex Junction ENGINEERS AND LAND Fax (802) 878-3957
Vermont 05453 SURVEYORS
or 136 Pearl Street
P.O. Box 5202
Essex Function, Vermont
St. Thomas and
U.S. V.I. 00301 #40 SubBase
Charlotte-Amalie-St. Thomas Tel (809) 776-3398
U.S. Virgin Islands

July 27, 1992

Contact Communications
1 Blair Park Suite 17
Williston, Vermont 05495

Attn: Mr. Paul Valois

RE: Antenna Tower
3097 Williston Road South
Burlington, VT

We have competed the location of the proposed antenna tower site at the above mentioned address and the results are as follows:

Latitude 44 27 29.12N
Longitude 73-08-27.23W

The above is based on monumentation established in NAD 1983 datum obtained from the Vermont Agency of Transportation Central Vermont GPS Network Densification conducted in October 1991. Survey accuracy is 20’ horizontal and 3’ vertical.

Elevation – Base of Tower 353.5 feet (USGS 1929)

Information obtained from the Airport Engineer indicates the highest portion of the east-west runway is at elevation 341.6 feet (USGS 1929).

Please contact me if you should require any additional information.

Sincerely;

Ronald E. Gauthior, Vt L.S. #574